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CLINIC OF DR. ARTHUR DEAN BEVAN

PRESBYTERIAN HOSPITAL

CONGENITAL WRY NECK

Summary Etiology and pathology of wry neck treatment—importance of early attention—the Mikulicz operation after treatment

August 14 1918

I DESIRE to present to you this morning a case of congenital wry neck. I would like to discuss this subject with you briefly and then I shall operate upon this case by a method which seems to me most desirable and which has given us excellent results.

Congenital wry neck is due to a birth injury of the sternocleidomastoid muscle followed by hemorrhage in and around the muscle and its sheath and followed by a histologic change in the structure of the muscle a sort of fibrous degeneration in which the muscle cells are replaced by connective tissue cells with resulting contracture. The contracture is not limited simply to the muscle itself for we have found in the cases that we have operated upon by the radical procedure that I shall demonstrate to you this morning that the deep cervical fascia which forms the sheath for the muscle is extensively involved and in addition there is as one might expect a marked change in the platysma myoides muscle not due to the fibrous degeneration but due to the fact that holding the head on one side markedly diminishes the size of the platysma myoides although it does not as a rule alter its histology to any extent.

Very marked changes occur in the head and neck and even in the rest of the body of the patient who is the subject of this deformity if it is allowed to continue during the period of development. If for instance the baby is born with this birth

injury and grows up to adult life say twenty years of age there is in addition to the contracture of the sternocleidomastoid a very marked atrophy of that side of the face. In the patient on whom I shall operate this morning this is very distinct although the boy is only eight years of age the left side of the face being very much larger than the right which is the affected side. Owing to the deformity the patient carries himself in a peculiar way trying to compensate by changes in the pelvis and in the spine for the abnormal position of the face and neck. This you will see very distinctly demonstrated in this boy (Fig. 327)



Fig. 327—Wry neck. Typical deformity. Note asymmetry of head and face.

There are as you know two different types of torticollis or wry neck. First the congenital type due to a birth injury and the resulting contractures. Second the spasmodic type. They have absolutely no relationship and are two distinct and separate conditions. For a number of years these cases of congenital torticollis I think have been badly handled simply doing tenotomies of the contracted muscle correcting the position of the head after the tenotomy placing it in an overcorrected position and keeping it there for a time in a plaster-of-Paris cast and later by a brace. This work gave rather unsatisfactory results although it is a procedure that is still practised by many.

orthopedic surgeons My attention was first called to a more radical and more satisfactory operation by an article by Mikulicz published about fifteen years ago Mikulicz went very thoroughly into the subject and suggested as the most satisfactory method of treatment the extirpation of the sternocleidomastoid muscle with the contracted deep cervical fascia

When I first read the article it seemed to me rather an extensive operation and I questioned its value as compared with the old tenotomy operation However, I at once proceeded to



Fig 328 --Head forced back and collar incision made

put it into practice with the most satisfactory results Instead of being a radical operation the operation with good technic is as a matter of fact quite simple and very safe, and gives certainly very much better results than the old tenotomy operation followed by plaster of Paris and braces

The patient is now anesthetized and I shall proceed to do the operation For a time I made an incision parallel to the contracted sternocleidomastoid I have, however, been operating for several years with the transverse collar incision such as we employ in goiter work, making a transverse incision in the

neck the center of which is opposite the contracted tendon and about $1\frac{1}{2}$ inches above the sternoclavicular articulation (Fig 328) The length of this transverse incision will necessarily vary with the size of the neck of the patient and with the extent of the contracture but there is no necessity of making a small incision. If necessary I make an incision 5 inches in length. This divides the skin and superficial fascia the platysma and exposes to view the contracted sternocleidomastoid note the contracted deep cervical fascia which forms the sheath of that muscle—this contracture of the sheath extends as you see for an inch or more on either side of the muscle. With a little force the fascia and muscle are put on tension and the lower two-thirds of the muscle freely and completely exposed. The contracted muscle is now divided at about the junction of the upper third with the lower two-thirds and the upper third of the muscle is left. This is done because in the upper third of the muscle is the spinal accessory nerve which should be saved because it supplies not only the sternocleidomastoid but also the trapezius. In other words we remove completely in this operation the lower two-thirds of the sternocleidomastoid muscle and the surrounding deep cervical fascia (Fig 329)

As I divide the muscle you see I can move the patient's head easily back into the normal position or into any position. I carefully follow out the dissection so as not to injure the internal jugular vein the carotid artery and the pneumogastric, which are now exposed and remove the muscle down to its point of attachment into the sternum and clavicle both the sternal and clavicular origins being divided. Hemorrhage from a few small muscular and arterial branches are now controlled by ligatures and the wound is closed without drainage care being taken not to suture the platysma myoides but simply to suture the skin and superficial fascia. In the primary dressing in order to obtain wound healing with the greatest comfort to the patient and with the least disturbance to the wound the head may be dressed in the old deformed position.

The after treatment is very important and very simple. I do not think that it is necessary to put the patient up in a

plaster of-Paris dressing immediately after operation, but we employ a starch bandage over our surgical dressing to give a certain amount of fixation, which adds to the comfort. After wound healing is complete the patient is instructed to exercise the neck and to sit in front of a mirror so that he can study the position of the neck, or, if it is a child, one of the parents instructs the patient how he is to hold the head and face. He is



Fig 329.—Dissection completed. Lower two-thirds of sternocleidomastoid removed, together with the fascial sheath

encouraged to do this, the mother or father keeping at him several times a day if necessary. If the child is old enough, we should arouse his pride in correcting the deformity so as to improve his personal appearance. If this is done persistently after the radical removal of the muscle, the child soon learns to keep the head in the right position and there is gradual improvement as far as atrophy of the side of the face is concerned,

although, of course if the operation is done after the individual has attained full growth there can be little or no change in this respect.

I would like to emphasize the importance of this method of treatment as compared with the older and more generally adopted schemes. I would like to emphasize also the importance of recognizing this condition early and correcting it before other marked changes have occurred as the result of the deformity. It is a pity to allow a child with a birth deformity of this kind to have to continue without correction after the third or fourth year. My experience has been that most of these cases are neglected until the deformity is marked and the atrophy so great that even though correction is made the facial alterations due to atrophy persist as a distinct disfigurement throughout life.

DESMOID TUMOR OF THE ABDOMINAL WALL

Summary Pathology of desmoid tumors—diagnosis, treatment—excision not urgent, but usually desirable

THE second case that I shall show you this morning is a patient who comes to us with what we have diagnosed clinically as a desmoid tumor in the abdominal wall. My attention was first called to this condition by an article by Nicholas Senn about twenty five years ago. I do not think that the condition is very generally recognized, and its pathology for a time was a matter of uncertainty and discussion. I believe we have

*Desmoid enclosed in ant
sheath of rectus abd*



Fig. 330.—Transverse section through abdominal wall, showing location of tumor and its relation to rectus sheath.

operated on possibly a dozen of these cases in this clinic. All of those that we have seen have had very much the same history. They have all occurred in women. They have all occurred in women who have borne children, and they have developed some months after the woman has given birth to a child. The first thing that is noted is a tumor close to the median line, which, on careful examination, proves, as a rule, to be connected with

tient for a number of years. Those that I have seen have not been malignant. Some reports have described them as fibrosarcomas and classified them as slowly growing slightly malignant tumors. Of course, the diagnosis cannot be made with absolute certainty without an exploratory operation and I have, therefore, as a rule, felt called upon to operate upon these



Fig. 332.—Closure of rectus sheath completed

cases and remove the tumor for the double purpose of relieving the individual of the tumor and for making a definite diagnosis.

This is a young woman of thirty. She has had several children and she has noticed this tumor which is about an inch to the left of the umbilicus for the last six or eight months.

Under ether I shall now make an incision directly over the tumor, turn back the skin and superficial fascia and expose the

the sheath of the rectus. These tumors vary in size from an English walnut to that of a fair sized apple. They are hard, firm, and painless, and not infrequently they are incorrectly diagnosed and are thought to be tumors within the abdominal cavity. As a rule, however, a careful examination will satisfy the surgeon that they are not in the abdominal cavity, but in

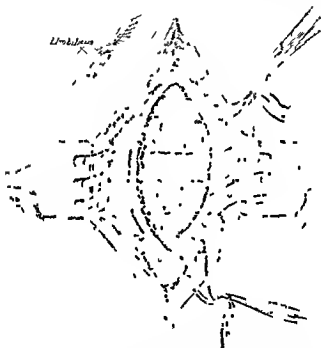


Fig. 331.—Tumor removed. Defect in sheath of rectus about to be closed by mattress sutures of catgut.

the abdominal wall. Histologically, they are like fibroid tumors. Clinically, if not completely removed they have a tendency to recur like the recurring fibroids that were discussed by the old time surgeons. They arrive at a certain size and then remain stationary. The indication for operation is relative and not absolute because they can be carried by the pa-

EPITHELIOMA OF THE LEG

Summary Epithelioma developing in the scar of an old leg ulcer healed years previously following operative removal of varicose veins and skin grafting of ulcer. Chronic irritation of old scars as a cause of cancer, great importance of failure properly to differentiate cancer from luetic lesions—necessity of early removal of section for microscopic diagnosis

THE third case that I shall show you this morning is a rather rare condition, a condition, however, which we have had the opportunity of studying pretty thoroughly in this clinic, and one which I think should be generally recognized more fully and completely than it has been.

This patient is one who was operated on years ago by Dr Nicholas Senn, who was then in charge of the clinic. The patient had an extensive leg ulcer. There were, as etiologic factors to consider as causes of this leg ulcer, a varicose condition of the veins and a probable specific history. Under anti-specific treatment and an operation on the veins the ulcer improved, but did not heal, and finally Senn dissected the ulcer out, covered it with Thiersch skin grafts, and succeeded in obtaining a complete cure.

The patient was very much gratified and went about his work for a number of years without trouble. In the last year, however, there has gradually developed a condition in and about the old scar, which for a time he thought was of little moment, but which has grown into a serious and annoying condition. You will see (Fig. 333) at the site of the old skin-grafting there is now a raised up, hardened, irregular lesion, looking very much like an epithelioma of the lower lip, and the patient gives very much the same history that one gets in the lip cases, that is, that scabs form over this lesion and then fall off, a new crust forms, and falls off, etc., but the lesion never heals completely.

We were quite sure of the clinical diagnosis, but I removed a small section of the growth and found it to be a typical epithelioma. We have seen a large number of these cases that is,

tumor which is the size of an egg irregular in shape and which has been developed in the anterior sheath of the rectus muscle (Fig 330) I cut quite wide of the tumor and remove not only the tumor but all that part of the anterior sheath of the rectus to which the tumor is attached This leaves, as you notice, a large defect in the anterior sheath of the rectus, which I close with mattress sutures of catgut (Figs 331 and 332) In order to make sure of keeping the edges of the sheath together during wound healing I shall, in addition, put in two mattress sutures of silkworm gut through the sheath and through the superficial fascia of the skin As you notice I have not opened the abdominal cavity at all.

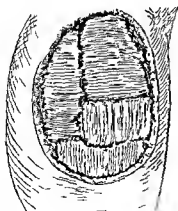
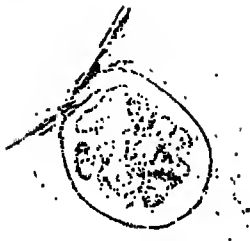
Postoperative Note—Histologically, the tumor proved to be a typical desmoid The patient went on to a complete and satisfactory recovery

this clinic a mouth or tongue carcinoma with this history of a slowly developing ulcer on the patient's tongue or mouth. In getting the clinical history of the case a clean cut syphilitic history is found or in examining the patient's blood a very positive Wassermann reaction is obtained and the conclusion jumped at at once that the lesion is specific. The patient is then placed upon antispecific treatment probably for weeks or months with varying results, sometimes apparent temporary improvement which seems to confirm the specific diagnosis but with no complete cure of the lesion which continues and very often unfortunately extends so widely that it is difficult or impossible to make a radical operation and then the simple thing that should have been done early in the history of the case is done and the diagnosis made definite that is a small section of tissue removed for microscopic examination. Time after time very intelligent and experienced medical men bring me cases with this same story. The answer of course is very simple. First the mere fact that the individual has a syphilitic history does not make it at all certain that the lesions that he develops later are due to that disease. A man with syphilis is quite as apt to develop carcinoma in fact is more apt to develop carcinoma than an individual who has never had syphilis and there is certainly nothing unusual in the coincident development of carcinoma in an individual with a specific history. The moral of course is that the Wassermann test or the patient's history should never be accepted as of any value in determining the character of one of these lesions certainly not to the point of excluding the possibility of the development of a cancer. The work in our own clinic has made us believe that syphilis is one of the most common etiologic factors in the production of carcinoma about the tongue and mouth. I want to make a special plea to you gentlemen who are here this morning that in these cases you should insist upon determining the diagnosis absolutely by removing a section and obtaining a microscopic examination before submitting the patient to treatment because so frequently the opportunity of curing the patient is lost by keeping him for weeks and months on antispecific treatment.

cases of epithelioma developing at the site of old pathologic processes, and have studied them with considerable care. These occur not only in the scar tissue of old varicose ulcers but we have had them occur in the scar tissue of burns not shortly after the receipt of the injury but years afterward.

There is a group of these cases that have been described in the literature as 'Kangri burn carcinomas' occurring in individuals in certain parts of Asia where in order to keep warm in the very high altitudes in cold weather the natives carry baskets about their body so arranged that they can fill the baskets with charcoal that burns very slowly and gives a good deal of warmth. Falling asleep or under the influence of liquor, burns from these baskets are very common and years afterward in the old age of the individuals many epitheliomas have developed in scars of these burns leading to the description of these cases as 'Kangri burn epitheliomas'. But we have studied also the same condition in paraffin workers in connection with some of our big oil companies where paraffin is made. These cases have been described in the literature as 'paraffin carcinomas'. The sequence of events here is that these people working with crude oil from which paraffin is made have a skin irritation about their hands, forearms and bodies especially the scrotum, with resulting dermatitis and furunculosis. The workers themselves describe this condition as paraffin boils. The individuals recover from this dermatitis and furunculosis and no immediate bad effects are noted but years later in a small proportion of these cases epitheliomas develop in the scar in these lesions and they are known as 'paraffin carcinomas'. We have also studied this same condition in the scars of lupus about the face and have handled a number of cases where in the scar of the old lupus process an epithelioma has developed.

I am inclined to believe that the most frequent and certainly the most important group of cases representing this same process is found in the development of epitheliomas in the mouth and tongue at the site of old syphilitic scars. Too great emphasis cannot be placed upon this fact because hardly a week, certainly not a month goes by but there is brought into



5cm graft in place

Fig 333 —1 Removal of tumor by wide incision through scar tissue 2 Defect covered with Thiersch grafts

until the lesion extends beyond the primary focus and has become inoperable

In this case this morning we have no evidence of the process having extended beyond the primary focus. I believe that it is still an epithelioma limited to this scar tissue. There is no glandular involvement. The man's general condition is good and we believe and of course hope that the radical removal of this cancer by local operation will cure the patient. This might be done by radium or x ray but I think in massive epitheliomas of this kind it is much safer to remove the lesion with the knife.

I shall go quite wide of the lesion and dissect out the entire growth. The skin superficial and deep fascia well out into the wound seems to be perfectly normal tissue (Fig 333 1). I have had the skin of the thigh on the same side prepared and we shall cover this area with Thiersch skin-grafts. These are made with a sharp razor flattened on one side and taking the skin from the outer surface of the thigh just below the great trochanter. You see it requires about four grafts to cover the entire area (Fig 333 2). You notice that the little oozing that persisted before we put on the grafts seems to be checked by the application of the grafts. It is important in putting on grafts to see that they are flattened out perfectly and that any blood that is beneath them is forced out.

We shall dress this with perfectly dry dressings and fix them in place with adhesive strips and a starch bandage. If there is no reaction we will leave the primary dressings on for a period of ten days. As a whole we have been obtaining more satisfactory results in these skin grafts with dry dressings than with moist dressings. Of course if there is any reaction or if there is any evidence of discharge through the dressings the dressings should be immediately removed care being taken not to displace the grafts.

I want to say in this connection what I have said a good many times of late years in this clinic, that in skin grafting you should be familiar with the fact that autogeneous grafts that is grafts taken from the same individual with good technic will

ULCER OF THE STOMACH ON THE LESSER CURVATURE

Summary Diagnosis—differentiation from cholelithiasis and carcinoma, technic of exploration of upper abdomen, treatment—excision versus medical management indications for operation postoperative care results following gastro-enterostomy transverse excision of large gastric ulcers

July 22, 1918

I WANT to operate upon a case this morning that comes to us with a questionable diagnosis. He has been under medical care for several years with pain in the upper abdomen presenting itself in two different ways. First, severe acute attacks at long intervals, and second, more or less stomach distress for periods of several weeks at a time, followed by intervals of about the same duration of complete relief. He is a man of thirty-eight. He gives a history that until about three years ago he weighed 140 pounds, before he had this trouble and that he has lost about 30 pounds since that time.

In analyzing the evidence secured in the case I find that he has, in addition to the abdominal symptoms and loss of weight a hemoglobin of about 70. Thorax and abdominal examinations are negative. Examination of the stomach contents shows a little more than normal acidity, no evidence of retention or obstruction at the pylorus. Fluoroscopic examination with a barium meal shows normal stomach and duodenal findings. He has a rather definite tenderness a little to the right of the median line and he has given me a very definite history of three recent attacks of severe pain which have all been very much alike coming on very acutely, extreme agonizing pain requiring morphin and the use of the hot water bag for relief, and lasting from a few hours to a day, not associated with vomiting or with any intestinal disturbance. Stool examination shows no occult blood and there has been at no time any history of vomiting blood from the stomach.

The character of these pains and the resulting tenderness, which is very marked immediately after the attack, seems to

almost invariably grow, that grafts taken from someone else almost never grow, for no matter how aseptically they are placed or how good the technic has been, at the end of ten to twenty days they usually break down and do little or no good. The fact should be widely known that in skin-grafting the grafts must be taken from the same individual in order to have any prospect of success.

no evidence of stone in the common duct. On general palpation I find that it is quite normal. I therefore must conclude that he is not suffering from gall stone disease, as I find no gross tangible evidence of such a condition. I now turn to the duodenum and examine the duodenum carefully. I find that it is quite normal. There is no evidence of any induration of a duodenal ulcer. I examine the pylorus and find that it is quite normal. It is patulous, as I can demonstrate by bringing my thumb and finger together, the index finger pressing on the gastric side of the pylorus and my thumb on the duodenal side, and I can feel that the pyloric ring is perfectly normal and of good size.

I now examine the stomach. There is no evidence of any neoplasm. I find, however, as I carefully examine the lesser curvature of the stomach a distinct and definite whitening due to connective tissue, which has contracted the lesser curvature somewhat, and as I continue my examination I think I can feel the induration of an ulcer on the lesser curvature about $1\frac{1}{2}$ inches from the pylorus. In order to be sure of this I carefully make a small opening in the gastrohepatic omentum just above the lesser curvature so that I can introduce my index finger into the lesser peritoneal cavity and palpate the posterior surface of the stomach. In this way I can palpate very carefully, with one finger on the posterior surface and my thumb on the anterior surface, the lesser curvature at the point of this induration and I can feel a very small crater like ulcer at this point of induration. Of course there is a possibility but no great probability that this is carcinomatous.

There is one of two ways in which we can now handle this case. We can either make this operation purely an exploratory one, close the incision and place the patient at once upon medical management for gastric ulcer, or we can resect this ulcer and remove the lesion completely and place the patient later on careful stomach management. That would make it improbable that any further ulcers would develop. Because of the long history of great suffering that this man has had and because it seems as though we could excise this ulcer without

be quite typical of gall-stone colic attack, and if it were not for the other stomach symptoms that he has had there would be no question in my mind but that he was suffering from gall stones in the gall bladder without any obstruction of the cystic duct, because there is no distention of the gall bladder and resulting tumor, and there has been at no time any evidence of jaundice. But in addition to these acute attacks he describes quite clearly that on a number of occasions he has had stomach distress coming on after meals relieved by soda, and continuing for periods of three or four weeks at a time. These latter attacks, of course, are suggestive of duodenal or gastric ulcer. I have talked the matter over quite freely with him and told him that I believed the chances are that he has gall-stones in the gall bladder, but that it might be a duodenal or gastric ulcer. I think from the long history of the case and absence of any filling defect in the fluoroscopic examination, the age of the patient, and the hyperacidity that we can clearly exclude any probability of a malignant process.

The patient is now thoroughly anesthetized and we shall make an exploratory and attempt to determine definitely the gross pathology that is responsible for the clinical symptoms. Because of the uncertainty of the diagnosis, lying between gall stones and ulcer I am making an S-shaped incision such as we make for gall-stone disease extending from high up in the angle between the ensiform cartilage and the angle of the rib down over the rectus muscle about parallel with the junction of the inner third and outer two-thirds of that muscle, fairly well toward the midline, extending down almost to the umbilicus and then sweeping outward to the right for about 2 inches.

Opening the peritoneal cavity I find no adhesions and the cavity quite free. I lift up the gall bladder and as you see it is blue and transparent and normal in size and appearance. I can empty the gall bladder by gradual pressure without any difficulty. I can feel no stones. I examine the cystic duct and can find no evidence of any stone in the cystic duct. I introduce my index finger in the foramen of Winslow and palpate the common duct between my index finger and thumb and find

no evidence of stone in the common duct. On general palpation I find that it is quite normal. I therefore must conclude that he is not suffering from gall stone disease as I find no gross tangible evidence of such a condition. I now turn to the duodenum and examine the duodenum carefully. I find that it is quite normal. There is no evidence of any induration of a duodenal ulcer. I examine the pylorus and find that it is quite normal. It is patulous as I can demonstrate by bringing my thumb and finger together, the index finger pressing on the gastric side of the pylorus and my thumb on the duodenal side, and I can feel that the pyloric ring is perfectly normal and of good size.

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any great risk, I shall attempt to do this in preference to trusting to medical management alone

Dividing the gastrohepatic omentum for a distance of about 2 inches between ligatures over the lesser curvature at the site of the ulcer, I now place a stomach clamp on each side of this area so as to keep out the stomach contents, and I cut out a saddle-shaped section of the lesser curvature including the ulcer (Fig 334, *a*) Here is the specimen (Fig 334 *c*), and you see that it is a beautiful example of a small punched-out peptic ulcer about the size of a pinhead There can be no question now as to the pathologic diagnosis It is not at all consistent with any malignant process I ligate the gastric artery on each side of the point of resection and close this V-shaped opening with three rows of sutures, one through the mucosa one through the muscularis and peritoneum, and the third, a Lembert suture (Fig 334, *b* and *d*) The abdominal incision is closed without any drainage The pads and sponges are accounted for and the patient is in very good condition at the close of this procedure, which, as you see, has not been a prolonged one

In the after management of a case of this kind we place the patient for the first twenty four hours upon rectal enemata of normal salt solution, about 8 or 10 ounces every three or four hours If the patient has much pain he is allowed a moderate amount of morphin. The patient is allowed to wash his mouth out frequently with a small amount of water, but he is instructed not to swallow it. At the end of twenty four hours the patient is started on a small amount of water about 1 ounce every hour, and if this is not followed by vomiting it is gradually increased to 2 ounces every hour, and he is allowed an ounce of milk or an ounce of broth every two hours This is gradually increased until a fair amount of liquid nourishment is given After the broth and milk are started we believe it is very desirable to give the patient a small amount of bicarbonate of soda and calcined magnesia in powder form about twenty minutes after the milk is taken This relieves the acidity and stimulates peristalsis and I believe lessens the tendency to vomiting The patient, after the immediate effects of the

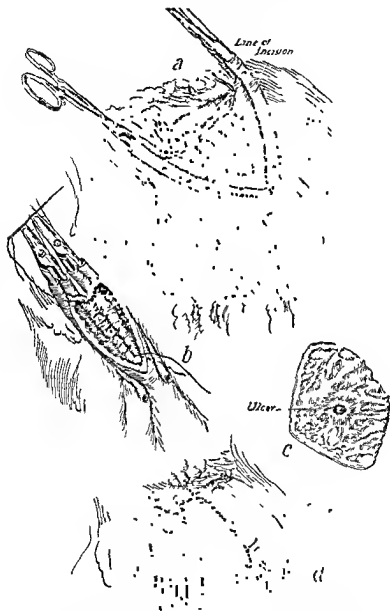


Fig. 334—*a* V-shaped excision of ulcer area *b* Closure of defect following excision by usual three-layer suture *c* Appearance of excised tissue *d* Closure of defect completed

operation are over, that is, on the second or third day, is placed on exactly the same sort of medical management for gastric and duodenal ulcer that we would employ if no operation had been undertaken, and it is persisted in for a number of weeks and the same care is taken in regard to the diet and after history of the case as though we were handling an ulcer in a purely medical way. If the patient persists in vomiting for more than twenty four hours we do not hesitate to wash out the stomach with great care in cases of this kind. We feel that the sutures are competent and we have not experienced any trouble from this procedure.

When it is possible to resect a gastric ulcer with little additional risk I think that this operation should be done. It is not, however, possible to apply the radical resection method to any great percentage of our cases of gastric ulcer. If it were generally adopted it would give a very great mortality and would not be a most satisfactory scheme of management. I would like to discuss with you briefly my views on this point. First, I am convinced that the great majority of gastric ulcers can be cured by proper medical management, and that this should always be our first choice in the handling of the case. There are, of course, a number of conditions that demand surgical management. These I believe to be cases with definite hypertrophic obstruction at the pylorus, cases with a history of repeated serious hemorrhages and cases in which medical management in spite of being efficiently followed out is not successful in curing the case. There is of course a very great difference between duodenal ulcers and gastric ulcers as far as the application of surgical therapy is concerned. Personally, I think that a duodenal ulcer more frequently calls for surgical management than gastric ulcer because it is a greater menace to the individual, the risk especially from perforation being much greater in duodenal than in gastric ulcer. In the second place the results obtained by the generally employed operation of gastro-enterostomy are much more satisfactory when employed for duodenal than in gastric ulcer. There are some surgeons and medical men who take the position that gastro-enterostomy is

of little or no value in ulcers in the stomach proper. I cannot, however, agree with that position. I believe that the majority of cases of gastric ulcer can be cured by a well functioning gastro-enterostomy. If expressed in figures I should say that in duodenal ulcer the gastro-enterostomy would be effective in 90 per cent. or more and in about 50 per cent. of the gastric ulcer cases. There is a class of huge indurated ulcers of the stomach which in a certain proportion of the cases resist all methods of medical management and which must be handled by excision if it is anatomically possible. The transverse excision of a large gastric ulcer is now an accepted and standard operative procedure. The operation is practically an excision of a through and through segment of the stomach including the ulcer and the area beyond well into healthy tissue and the large wound in the stomach closed by suture. This is necessarily formidable and carries a good deal of mortality with it. There are a number of cases with huge gastric ulcers in which excision is anatomically exceedingly difficult and I am unfortunately able to show you a specimen of this kind which we have just obtained from the postmortem examination of one of my classmates in medical college. I had been very much interested in this case because of the fact that the patient was an intimate friend of mine for a great many years. I would like to show you this specimen and give the history of the case as I think it is peculiarly interesting and instructive.

You will see that this specimen (Fig. 335) shows a huge saddle shaped ulcer about $1\frac{1}{2}$ to 2 inches in its various diameters at the lesser curvature of the stomach very close to the esophageal opening. This patient came to my service about three weeks ago suffering from marked stomach distress and great loss of weight and increasing weakness. His hemoglobin was low. He was able to walk about, had some pain immediately after meals and had occult blood in the stools, normal acidity or slightly higher than normal acidity, no tumor to be felt, marked tenderness just below the ensiform cartilage. In the fluoroscopic examination a filling defect was evident and the probable clinical diagnosis of carcinoma was made. We felt

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You will see that this specimen (Fig. 335) shows a huge saddle shaped ulcer about $1\frac{3}{4}$ to 2 inches in its various diameters at the lesser curvature of the stomach very close to the esophageal opening. This patient came to my service about three weeks ago suffering from marked stomach distress and great loss of weight and increasing weakness. His hemoglobin was low. He was able to walk about had some pain immediately after meals and had occult blood in the stools. Normal acidity or slightly higher than normal acidity. No tumor to be felt, marked tenderness just below the ensiform cartilage. In the fluoroscopic examination a filling defect was evident and the probable clinical diagnosis of carcinoma was made. We felt,

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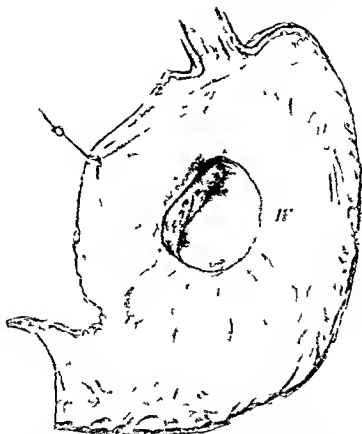
condition was so bad that I did not feel warranted in making an exploratory operation, and after being under our observation for about three weeks the patient suddenly became very weak with every evidence of internal hemorrhage lapsed into coma, and died

The postmortem examination showed this very deep punched out ulcer on the lesser curvature and on careful examination I think we can find the open mouth of the vessel which produced the fatal hemorrhage. The intestinal canal was full of blood.

As we analyze the facts in this case it is particularly instructive because the evidence seemed to be in favor of carcinoma, and yet it was an ulcer pure and simple. I am glad that we placed him on ulcer management because I think that was the wisest thing to do from the standpoint of the symptoms, and the postmortem findings confirmed the wisdom of that course. In analyzing the facts I naturally asked myself whether it would have been wise to have operated on this case or not. Evidently it would have been impossible to have resected this ulcer because of the fact that it encroached on the esophagus, and it would have been impossible to have made a closure and I doubt very much whether gastro-enterostomy would have been of any more service here than was proper stomach management, but, of course that is simply a matter of opinion.

In connection with this case I would like to make this statement, that as we study more and more of these stomach cases the difficulties of making absolutely a diagnosis between ulcer and carcinoma in a very considerable group become more apparent. One might I think say this that a typical stomach ulcer case and a typical carcinoma of the stomach case can be clearly diagnosed with a good deal of certainty but there is a very considerable group illustrated by the case which I am now discussing in which the findings are such as to make it difficult or impossible to differentiate between carcinoma and ulcer. We thought in this case that the diagnosis was most certain to be carcinoma and yet it proved to be ulcer. We have a large series of cases in which even at the time of operation we have felt that the tumor like lesions were clearly carcinomatous and

however that it would be well to place him for a short time on ulcer management. This was done with rather marked relief



F 33 Huge crater like ulcer on lesser curvature which produced a filling defect in the radiogram simulating carcinoma. death from hemorrhage. Note eroded vessel in floor of ulcer

apparently from the standpoint of relieving his pain. He began to vomit however and on several occasions the vomitus was bloody. He steadily and rapidly went down hill. The

ABSCESS OF THE LUNG—AN IMPORTANT SEQUEL TO TONSILLECTOMY

Summary Diagnosis of lung abscess—importance of the x-ray and exploring needle technic of operation—combination of local anesthesia and the electric cautery necessity for prolonged drainage etiology cases following tonsillectomy

July 24 1918

I WANT to present to you this morning a patient upon whom we have made a clinical diagnosis of abscess of the lung We shall examine the thorax carefully with an exploring needle and attempt to locate the abscess and if we are successful in doing this proceed with the operation for the purpose of securing thorough drainage

This young man is a lieutenant in the United States Army About two months ago he had a rather severe attack of pneumonia from which he made a slow and incomplete recovery Some cough persisted and some dulness on the left side in the lower lobe and an irregular temperature The attending physician advised that he be sent to Colorado to recuperate While in Colorado he became suddenly worse and the medical attendants who were called made a diagnosis of lung abscess and urged immediate operation which was undertaken This was done under ether anesthesia the eighth rib resected in the axillary line and the pleural cavity opened No free pus was found in the pleural cavity and the lung at once collapsed The patient's condition became extremely bad and the operation was discontinued and the incision completely closed This left an operative pneumothorax The wound was clean and healed aseptically the air in the chest was soon absorbed and for a time there was some improvement in the man's condition It was thought wise however to bring him back to Chicago and we have had him in the hospital now for several weeks on my service and we have had several of my colleagues in consultation on the case The x ray does not show definitely, a lung

where we have made a palliative gastro-enterostomy, and where we have found the patient alive and well years after, with a complete disappearance of the tumor, demonstrating that the diagnosis that was made even after opening the abdomen was erroneous

Postscript — Microscopic examination of the segment removed at operation showed that it was a peptic ulcer with no evidence of malignancy. The patient went on to a very satisfactory recovery and has rapidly gained weight and strength since the operation

inject about 1 dram of $\frac{1}{2}$ of 1 per cent apothemin. In the intercostal space between the eighth and ninth ribs in the axillary line I introduce the exploring needle. This needle is of moderate size, and as I withdraw the piston I find that no fluid of any kind is drawn into the barrel of the syringe. I can feel, however, by moving the needle very gently that it is in the

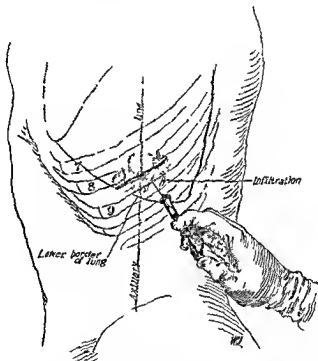


Fig. 337.—Exploring needle in position injection of local anesthetic

free cavity and not in firm tissue. Withdrawing this needle and employing one of larger caliber and now withdrawing the piston you see that I draw into the barrel about a dram of yellow mucoid like pus. That explains definitely that we are in a cavity containing pus. Leaving the needle *in situ*, I now infiltrate the soft tissues for a distance of 3 or 4 inches in the eighth intercostal space with apothemin solution and incise the

abscess It shows, however, a little above the diaphragm a shaded area which is unlike the normal lung and suggestive of some induration of the lower part of the lower lobe (Fig 336)

The general clinical picture is suggestive of lung abscess in the sense that he has an irregular temperature, shooting up as high as 104° F at times with cough and some expectoration,

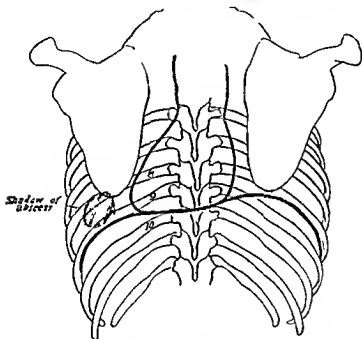


Fig 336.—Abscess of lung Diagram illustrating roentgenogram of chest.

though not in large amounts and nothing else to account for these findings The sputum has been examined and no tubercle bacilli have been found.

I shall operate on this case under local anesthesia and shall use apothecin, which I have been using with great satisfaction now for some months I shall use this also in the minor procedure of exploring the chest for abscess with the needle I

sive is passed through these safety pins so as to hold them in position and a copious gauze dressing is applied externally (Fig 338 insert)

AFTER HISTORY OF CASE

The after history of this case is proving to be very interesting. The temperature at once diminished and finally became normal. The man improved very much in weight and strength in three weeks gaining 15 pounds. The discharge from the abscess was quite copious and continued of the same mucoid pus character. There was a marked diminution in the expectoration and the cough finally ceased almost entirely.

About four weeks after the operation I had the patient come back to the hospital and I injected some bismuth paste a small amount of it through the tube with two objects in view one to take an x ray picture of the exact extent of the cavity. The second object was that it was possible that the bismuth paste would assist in curing him. When I injected about a dram of the bismuth paste the patient began to cough rather violently and I discontinued it. I sent him down to the x ray room and obtained an x ray picture. I found the picture showing that the paste was limited to the small tract of the tube and then passed directly into a bronchus and the paste could be seen thickly filling the two or three small bronchi just behind the tube. The injection of the paste proved to be very distressing in that it was followed by severe coughing which persisted for four or five hours and by a cessation of the discharge for twenty four hours and then a very sharp increase in the amount of discharge and with a rise in the temperature. These acute symptoms however disappeared in four or five days and the patient is now on the road to recovery in the sense that he is increasing in weight and strength. His cough has disappeared but the mucus like discharge continues in rather large amounts requiring changing the dressings two or three times a day. There is here a fairly direct communication between the abscess cavity which is now reduced to a mere fistulous tract and the bronchus.

tissues freely for a distance of about 2 inches on each side of the needle (Fig. 337). I then take this electric cautery, which is an admirable instrument, and burn a good-sized canal, about as big as my little finger, around the needle and into the abscess (Fig. 338). The fluid that comes out is rather a mucoid pus, and not in very large amounts.

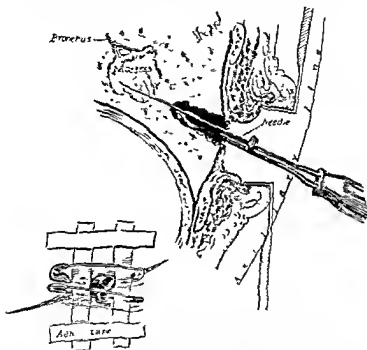


Fig. 338—Cavity located by exploring needle. With the needle as a guide a suitable tract for drainage is established by means of the electric cautery. Insert: Drainage-tubes in position, anchored by safety-pins and adhesive plaster strips.

I now introduce two drainage-tubes or, rather, two No 14 English size soft-rubber catheters, which I have vaselined, gently through this canal into the abscess cavity, using no force whatever. They run in for a distance of about $3\frac{1}{2}$ inches, and a good size safety-pin is put in each one of these rubber catheters so as to prevent its slipping either in or out. A strip of adhe-

or intratracheal ether anesthesia I have discussed this subject with several of my colleagues who have been interested in the subject of pressure cabinets and intratracheal anesthesia and I am convinced from my own operative experience that in all but a very small group of cases one can obtain more satisfactory results with local anesthesia than in any other way. If the technic is good, there is little or no pain experienced by the patient.

I am fortunate in being able to present to you this morning another lung abscess case which has especially interesting features. It is not now an operative case, but I am presenting it to you because I want to give you the benefit of the instruction which we ourselves have been able to obtain from a study of this patient.

This woman is thirty five years of age, the mother of six children. The woman had always had excellent health until about three months ago, when she was suddenly seized with acute abdominal pain. A very good surgeon was called, who made a diagnosis of appendicitis. The surgeon, however, was not called until several days after the onset of the symptoms. He advised immediate operation and this was done. On opening the peritoneal cavity a ruptured, gangrenous appendix was found with a large accumulation of pus. The gangrene had extended to the wall of the cecum. The patient was in extremely bad condition. The pus was mopped out. It was impossible to suture the friable gangrenous cecal wall. Drainage tubes and gauze packings were introduced and the patient made an immediate recovery from threatened death from general peritonitis.

There was left, however, a large fecal fistula in the cecum. She improved for a number of days. The temperature, however, never returned to normal and at the end of three or four weeks when I saw her she had a very large fecal fistula out of which poured almost all of the fecal contents, although she occasionally had a bowel movement through the rectum. She had a persistent temperature varying from 101° to 103° F and was very weak. It was evident that if the condition

The further management of the case is at this time difficult to determine. I think the best plan will be to make no further attempt at closing the cavity with bismuth paste but simply to secure free drainage and attempt to build up the general health of the patient and probably be satisfied for a great many months or even years with his wearing a tube and maintaining good drainage.

We have had quite an experience with these abscesses of the lungs and many of them are best handled by frankly accepting the position that we must drain them indefinitely. Certainly in half of the cases of lung abscess which we have operated upon the patients have been in better condition with permanent external drainage than where an attempt was made either with paste or by operative procedure directly applied to the lung to cure the external fistula. I would like to emphasize this fact because naturally the surgeon desires to get rid of the permanent fistula in a case of this kind and yet frequently it certainly is an unwise thing to do for the best interests of the patient. I have a number of patients who are perfectly comfortable with external drainage from a lung abscess with a slight amount of discharge and who have been in this condition for years. On the other hand where I have made an attempt to cure the case by direct operative interference such as the resection of a number of ribs and allowing the chest wall to collapse with the hope that this will obliterate the lung cavity or where I have used bismuth I have unfortunately in many cases done more harm than good. To be sure we have a large series of cases in which the results have been most satisfactory where we have drained the lung abscess and have had a complete and perfect cure without the necessity of persistent external drainage.

I would like in connection with this case to say a word in regard to the anesthetic to be employed. We have been able to so perfect our technic of local anesthesia that in almost all of these thorax operations for lung abscess it has become the anesthetic of choice very much safer and very much better than a general anesthetic or even any pressure cabinet scheme.

that there was no empyema. I could not, however, make out the presence of any pus in the subphrenic space, which I thought was the probable clinical diagnosis. I also at that time explored the pelvis very carefully manually, as one of the attending medical men thought the persistent temperature was due to a pelvic abscess, but none was found. I then came to the conclusion that she probably had a septic thrombus in the portal vein or in the radicals of the portal vein, or else she had a small subphrenic abscess or a small lung abscess which I

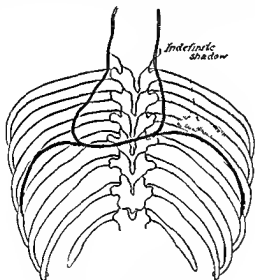


Fig. 340.—Diagram of roentgenogram

could not find with a needle. It is clearly our duty not to make a radical operation in these obscure cases unless we can locate pus definitely at some point. I followed this rule, which I regard as a wise one, in this case.

I treated the fecal fistula with soft bismuth paste, which we used twice a day, and gradually the soft tissues contracted at this point and the fecal contents were passed more and more through the rectum and less and less by the fecal fistula until we succeeded practically in preventing with the bismuth paste,

persisted for any great length of time it would be fatal (Fig 339)

I examined the case with the attending surgeon with extreme care. We could find no evidence of an abscess in the abdominal cavity or in the pelvis. There was, however, some dulness over the right lower lobe. The x-ray picture showed

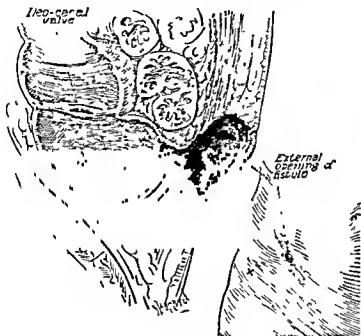


Fig 339—Section in sagittal plane illustrating size and course of fecal fistula.

no evidence of empyema, but an indefinite shadow over the dome of the diaphragm on the right side (Fig 340). She complained of no pain and no tenderness, so I made a diagnosis of probable subphrenic abscess or abscess in the lung. After she was transferred to my service I very carefully explored the right side of the chest with an exploring needle, but could not locate any pus. I could determine I think beyond question,

to a dozen of these cases occurring within a period of two or three years in the surgical service of the Presbyterian Hospital

The exact route of infection that occurs in these cases is not easy to establish in every case. There are certainly two possibilities one that the infection occurs as a direct aspiration pus and blood from the tonsil at operation being inspired into the trachea and bronchi and finding its way into the lung and there becoming a focus for lung abscess. I am inclined to believe that this is not the usual sequence of the abscess and that most of these lung abscesses following tonsillectomy are hematogenous that the infection occurs at the site of operation and obtains access to a vein and is carried as a small infected embolus to the heart and is admitted through the pulmonary artery into the lung. As an argument in favor of this route I would like to submit the fact that in addition to abscesses in the lung following tonsillectomy we have had several cases of brain abscess develop some of these without any previous lung abscess occurring in the cases and others where the history was that of tonsillectomy then a lung abscess and following the lung abscess the development of an abscess in the brain. Many of these cases are fatal. They are all serious. They should be handled in the way which I have just handled this first operative case this morning by determining with the x ray and exploring needle the location of the abscess and securing drainage by operation with the electric cautery under local anesthesia. From our experience with these cases I want to decry the employment of a general anesthetic and emphasize again the importance of continuous drainage of the lung abscess for a long period of time.

almost all escape of feces from the fistula. I gave instructions to have the patient take all the nourishment possible and to have her put in a wheel chair every day and taken on the roof and kept in the fresh air.

I re-examined her from time to time to see if we could detect the presence of any definite tangible focus of suppuration. The woman's general condition remained about the same for several weeks and then she developed a rather severe persistent cough. This was followed by very free purulent expectoration in very large amounts and an immediate diminution in the temperature. Within a week the temperature came down to normal and the patient is making a very satisfactory recovery. There can be no doubt but that in this case the woman coughed up pus from a small subphrenic abscess which we have been unable to detect or from a lung abscess. I am rather inclined to think it was a lung abscess and not a subphrenic abscess because there was never a foul-smelling or fecal odor although that fact of itself would not warrant our making an absolute differentiation.

In connection with these two cases I might discuss with you very briefly the lung abscesses that we have had on our service in the last three years which have followed what is regarded usually as the safe and simple operation of tonsillectomy. We have had certainly ten to a dozen lung and brain abscesses following tonsillectomy. I think that this should be more generally known. Tonsillectomy is by no means a safe operation. It carries with it very considerable amount of risk and the greatest risk is that of subsequent lung or brain abscess. I have been astonished in discussing this subject with a number of throat specialists to have them tell me that they have never had this accident occur in their work and that they had not seen any of these cases. Naturally cases of this kind would drift into a large metropolitan hospital as many of them are obscure and they would find their way into an institution where they could obtain the services of a consultant and the advantage of obtaining expert x-ray investigation etc. I suppose that that fact will account for our being able to report ten

CLINIC OF DR DANIEL N EISENDRATH

COOK COUNTY HOSPITAL

A CLINICAL LECTURE ON THE ACUTE ABDOMEN

Summary Acute lesions of the spleen differentiation of torsion of the omentum acute suppurative epiploitis, occlusion of the mesenteric vessels, acute infections of the mesenteric lymph nodes. Meckel's diverticulitis Intestinal obstruction Sigmoid diverticulitis Infections of the cecum and appendix Peritonitis Acute affections of the genito-urinary tract. Extra-abdominal causes of acute symptoms Exploration of patient presented at beginning of lecture—discovery of appendiceal abscess in an unusual location. (The patient was a man of fifty never ill until two weeks prior to admission to the hospital. He had been suddenly seized with pain in the right side of the abdomen and around the umbilicus on account of his high temperature rapid breathing and upper abdominal rigidity a diagnosis of thoracic disease with reflex abdominal symptoms had been made by another surgeon.)

We have finished our discussion¹ of the acute lesions of three of the upper abdominal viscera, viz (1) liver and bile tract (2) stomach and duodenum, and (3) pancreas We will now consider the acute lesions of the remainder of the abdominal viscera and any other conditions such as tabes, vascular crises, spinal lesions, hysteria etc, which may give rise to acute symptoms simulating those of the abdominal viscera The first structure whose acute lesions we will consider is the spleen

(a) *Acute perisplenitis* occurs so rarely as a primary condition that a separate consideration may be omitted

(b) *Abscess of the Spleen*—This is a comparatively rare affection With the exception of abscess occurring during typhoid and as a metastasis in pyemia, nearly every non traumatic abscess of the spleen is secondary to some suppurative

¹ The first part of this clinical lecture upon the acute abdomen was published in the SURGICAL CLINICS August 1918 to which the reader is referred for information in regard to the classification of acute abdominal affections used by the author



those of acute strangulation of any intra abdominal viscus differing only in one respect *viz* localized rigidity and a tender mass if a hernia is present. The signs of ileus are less marked

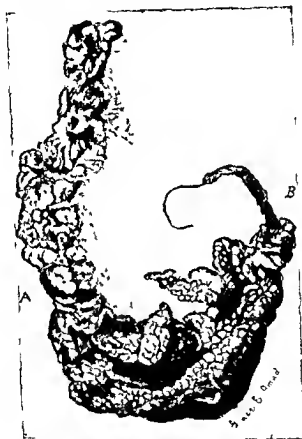


Fig. 341.—Torsion of the entire great omentum. *A* Pedicle or point of constriction above the strangulated omental mass. *B* greatly stretched adhesions twisted into a slender cord like structure (F. Her)

than in a strangulated hernia while on the other hand the clinical picture of the acute abdomen develops more rapidly than in the case of appendicitis for which torsion of the omentum has been most frequently mistaken. To recapitulate if a

process in the course of the portal vein. The most prominent symptoms are pain, rigidity, and tenderness in the left upper quadrant of the abdomen accompanied by fever. Careful examination and a good clinical history will usually enable one to find the seat of the primary infection.

(c) *Torsion of a Movable Spleen*—This condition is also rare but occurs often enough to be thought of in the differential diagnosis of acute lesions of the upper abdomen. The symptoms are quite similar to those of the twisting of the pedicle of other structures such as the kidney, ovarian cysts, pedunculated uterine fibroids, etc.—viz., severe pain, rigidity and tenderness localized in the case of the spleen in the left upper quadrant, vomiting, more or less shock.

If the spleen is extremely movable as in a recent case reported by Sahba,¹ where it was found in the true pelvis, the strictly local signs, such as pain, tenderness and rigidity are found lower down.

Let us next consider the acute affections of the omentum and mesentery, including the vessels of the latter. These include the following:

(a) Torsion of the omentum

(b) Acute suppurative epiploitis

(c) Occlusion of the mesenteric vessels (thrombosis and embolism)

(d) Acute infections of the mesenteric lymph nodes

(a) *Torsion of the Omentum*—This occurs in an acute and a subacute or recurrent form, and is due to a twisting of the entire omentum or only a part of it upon its long axis (Fig. 341). In the majority of reported cases it is associated with a hernia, the omentum forming a portion of the contents of an inguinal hernia which is irreducible because of the adherent omentum. From two to ten complete twists may be present and the torsion may be around one or two fixed points. As a result of the torsion circulatory changes, varying from extreme congestion to gangrene, may occur. Clinically, there are two types. The principal symptoms are quite similar in both of these viz.,

¹ Surg. Gyn., and Obst. 1918 27 73

those of acute strangulation of any intra abdominal viscus differing only in one respect viz localized rigidity and a tender mass if a hernia is present. The signs of ileus are less marked

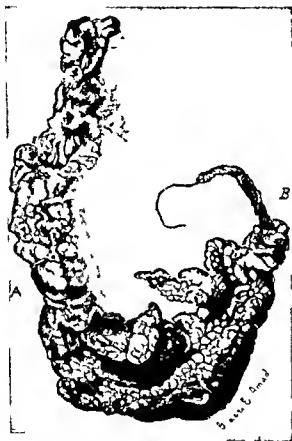


Fig. 341.—Torion of the entire great omentum. 1 Pedicle or point of connection above the strangulated omental mass. B greatly stretched adhesions twisted into a slender cordlike structure (Tuller).

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¹ Surg., Gyn., and Obst., 1918: 27-73.

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Fig 341.—Torsion of the entire great omentum. *A* Pedicle or point of constriction above the strangulated omental mass. *B* greatly stretched adhesions twisted into a snake-cord-like structure (F. H. R.)

than in a strangulated hernia while on the other hand the clinical picture of the acute abdomen develops more rapidly than in the case of appendicitis for which torsion of the omentum has been most frequently mistaken. To recapitulate if a

hernia is present we feel a tender mass extending upward from the corresponding inguinal or femoral region accompanied by sudden severe pain vomiting and other signs of an acute abdominal crisis. If no hernia is present the diagnosis is far more difficult because the tumor mass may not be felt and we have only the symptoms of acute strangulation of an intra abdominal viscus. In the recurrent form the attacks may subside in a few hours to a day or two the condition often being diagnosed as recurrent appendicitis it being almost impossible to make a diagnosis in the absence of a palpable mass extending upward from an irreducible hernia.

(b) *Suppurative Lymphoitis*—Hessert¹ has recently reported two interesting cases in which acute abdominal symptoms (pain fever localized rigidity and tenderness and a mass) appeared after inguinal herniotomies. At the secondary operation multiple foci of infection (abscesses) were found in the omentum and were no doubt due to infected ligature material. I have only referred to these cases because this condition must be considered in the differential diagnosis of the acute abdominal symptoms following any operation in which the omentum required ligation.

(c) *Occlusion of the Mesenteric Vessels*—Since we cannot differentiate clinically as to whether the mesenteric artery has been obstructed by an embolus or the mesenteric veins occluded by a process of thrombosis I agree with Eisenberg and Schlink,² who advocate the use of the term mesenteric vascular occlusion. Arterial occlusion occurs in about 60 per cent and venous thrombosis in 40 per cent of the cases. The condition is one which only occurs in adult life—from the age of twenty to that of sixty—arterial closure occurring usually toward the latter age. The jejunum and upper ileum are most commonly involved and the changes in coils of intestine whose blood-supply has been interfered with vary as in a strangulated hernia from mere vascular stasis to gangrene. Hence the appearance of the presenting coils varies from dark red to black

¹ Surg. Gyn. and Obst. 1916 23 297

² Ibid. 1916 27 6

(Fig 342) Clinically it is very difficult to make a diagnosis other than that of some acute abdominal condition calling for surgical interference hence one is not surprised to find that in only 4 of the 366 cases collected by Trotter was a diagnosis made before operation. The condition is mostly diagnosed as ileus, angina sclerotica abdominis, or a severe enterocolitis. The symptoms greatly resemble those of the diseases mentioned,

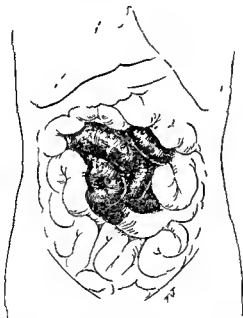


Fig 342—Mesenteric vascular occlusion. Note reddish black discoloration of a number of coils of jejunum and ileum in a case of embolism of the superior mesenteric artery

viz (a) pain either recurrent or continuous of a diffuse and severe character usually localized in the epigastric or umbilical regions (b) more or less diffuse tenderness (c) abdominal distention and (d) diarrhea. The stools are thin, offensive, and often bloody. In some cases the diarrhea is absent and the vomiting abdominal distention and inability to secure a bowel movement or the passage of flatus lead to a diagnosis of ileus

The generalized symptoms of the intestinal toxemia (sub-normal temperature rapid soft pulse cyanosis etc.) appear quite early and the entire course of the disease is a most rapid one toward a fatal outcome in the majority of cases. The only hope of surgical relief is in an early diagnosis hence we must always keep this condition in mind in every case presenting the severe acute intestinal symptoms just mentioned in patient above the age of forty and especially if the stools contain much blood and the clinical picture develops more rapidly than in the ordinary case of intestinal obstruction.

(d) *Acute Infections of the Mesenteric Lymph nodes*—I have seen a number of cases in which the acute enlargement of these lymph nodes gave rise to symptoms resembling those of appendicitis or even of intestinal perforation. In a case seen in consultation on account of a suspected typhoid perforation we found an acute suppuration of the lymph nodes at the root of the mesentery and quite recently I have operated a child with clinical symptoms of an acute abdominal cramp which we thought to be either an appendicitis or possibly an intussusception but found only an intense acute swelling of all of the mesenteric lymph nodes. Howell reports a case of acute lymphatic leukemia with predominance of the enlargement of the thoracic and abdominal lymph nodes with very little enlargement of the superficial nodes. The clinical picture resembled that of appendicitis.

Acute Affections of the Small Intestine—The acute conditions which I will place under this heading are *a* Inflammatory changes in Meckel's diverticulum *b* intestinal obstruction (ileus of various kind *c* enterocolitis *d* lead colic and *e*) reflex ileus. To include all forms of intestinal obstruction would at first glance seem rather arbitrary but since the clinical picture of an acute obstruction of the large intestine so greatly resembles that of the same condition in the small intestine it would seem to be justifiable for diagnostic purposes to include all forms of intestinal obstruction. I simply mention enterocolitis and lead-colic for the sake of thoroughness since both conditions must be borne in mind in the diagnosis of an acute

abdominal condition. Detailed consideration of these will be omitted here owing to the fact that they should be so well known to everyone as to render a description of their principal features superfluous. By 'reflex ileus' is meant a paralytic condition of the small intestine which at times accompanies the



Fig. 343.—Meckel's diverticulum with large mesenterium. The umbilica (omphalomesenteric) vessels run along the free edge of the mesenterium and empty into the mesenteric artery and vein respectively (Bostrom)

passage of a ureteral calculus operations upon or injuries to the kidney and this condition will be referred to later in the section upon the kidney.

(a) *Acute Meckel's Diverticulitis*.—Up to a recent period when the term *diverticulitis* was used one usually understood

that the reference was to an inflammation of the diverticulum or projection arising from the lower ileum which was first described by Meckel. At the present time however it is necessary to specify Meckel's diverticulitis when we refer to this structure to distinguish it from pathologic changes with resultant clinical pictures taking place in the diverticula of the large intestine to which attention will be directed in the next section.

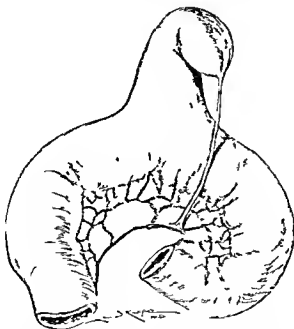


Fig. 344.—A frequent form of Meckel's diverticulum with fibrous cord (omphomesenteric vessel) which usually contains the omphomesenteric vessel. (Wilm.)

In the human embryo there is a direct connection between the umbilicus and the lower ileum through the medium of a finger-like projection of the gut (Fig. 343) which is called Meckel's diverticulum and has its own mesentery. From the surgical standpoint this remnant of an embryonic structure

interests us (*a*) because the diverticulum is subject to the same changes as the result of infection of its walls as the vermiform appendix namely, acute inflammation up to the stage of gangrene (Fig. 345), with or without perforation and resulting localized or general peritonitis, (*b*) because various forms of intestinal obstruction can result if the terminal ligament (representing the atrophic distal portion) is attached to the umbilicus

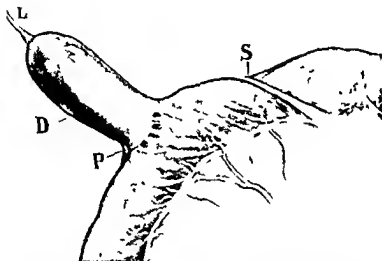


Fig. 345.—(Anomalous Meckel's diverticulum (author's case). *D* Three perforations at its base. *L* terminal ligament by which the diverticulum was attached to the mesentery of the caecocolic intestine. *S* a band the remnant of the terminal ligament which caused strangulation of the gut proximal to inflamed diverticulum. The origin of such a band can be readily understood by referring to Figs. 346 and 347.

or to the mesentery of the gut from which the diverticulum¹ arises (Fig. 346). I will refer to this cause of intestinal obstruction later and desire at this time to call your attention to the clinical picture due to inflammatory changes alone.

In some of the cases there is a previous history of pain

¹ See author's article on Ileus Due to Meckel's Diverticulum *Ann. Surg.*, 1909, 50: 1278.

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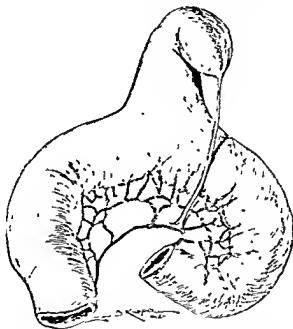


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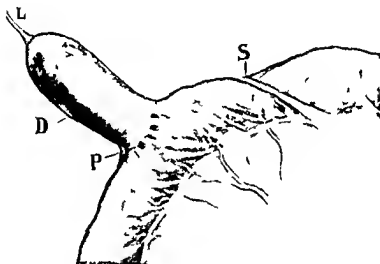


Fig. 345.—Gangrenous Meckel's diverticulum (author's case). D Three perforations at its base. L terminal ligament by which the diverticulum was attached to the mesentery. S Small intestine. The diagram is a black and white line drawing with stippling for shading.

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In some of the cases there is a previous history of pain.

¹See author's article on Ileus Due to Meckel's Diverticulum Ann Surg 1909 50 12 8

located nearer to the umbilicus than is the case in recurrent appendicitis. In the majority of cases there is no history of such an attack, the onset being sudden and the symptoms indistinguishable from those in acute fulminant appendicitis. Occasionally, as in my own case (see Fig. 356), the pain, tenderness and rigidity are nearer to the umbilicus. My chief reason in bringing this condition to your notice is to look for it in case the visible changes in the acute appendix as seen at operation do not correspond to the severity of the clinical picture.

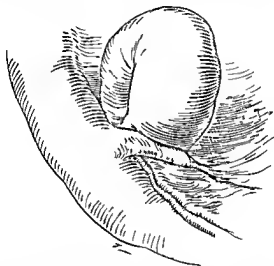


Fig. 346—Ileus. Strangulation of small intestine beneath a Meckel's diverticulum whose terminal ligament has become attached to the mesentery from which the diverticulum arises (author's case).

(b) *Intestinal Obstruction (Ileus)*—It is impossible in a general lecture like this one to discuss in detail the various forms of ileus. Ileus is usually divided into two principal forms (a) dynamic, (b) mechanical.

(a) Dynamic or paralytic ileus is the result of a paresis or in some cases of a complete paralysis of the contractile power of the gut wall. It occurs in peritonitis as the result of the

toxins acting upon the musculature of the intestinal wall, and here is called septic ileus. Again, it is found as a postoperative condition when no sepsis is present, but is then due to trauma to the gut wall through prolonged exposure, rough manipulation, etc. This is the true form of paralytic ileus, due, no doubt, to some temporary insult to the nerve supply of the gut. A third form is seen when much blood or bile or urine is present in the peritoneal cavity. We also see a form of reflex paralytic ileus after operations upon or injuries to the kidney or ureter, after the passage of ureteral calculi, torsion of an ovarian cyst, or pedunculated uterine fibroid. Finally, a true paralytic ileus occurs after injuries of the dorsal portion of the spinal cord.

(b) Mechanical ileus can be divided into two classes—obturation and strangulation. A glance at Fig 347, 1-6 will serve to recall the principal subdivisions of these two classes. I will simply enumerate them here. Obturation ileus (a) congenital strictures, (b) obstruction of lumen by fecal matter, enteroliths, gall-stones and other foreign bodies, (c) obstruction of lumen by tumors (Fig 347, 3) from without or of gut wall itself, (d) obstruction by adhesions (Fig 347, 6) or bands (Fig 347, 5), (e) obstruction by strictures (Fig 347, 4).

Strangulation ileus (a) through apertures (Fig 347, 2), (b) internal herniæ, (c) by and of Meckel's diverticulum, (d) volvulus, (e) intussusception.

The three symptoms common to all forms of ileus are (a) inability to pass flatus or feces, (b) vomiting at first mucus, then bile, later a brownish, sour, fetid material, wrongly called fecal, (c) gradually increasing abdominal distention. The exception is intussusception, here the vomiting and abdominal distention are not at all prominent features, and in some cases there are fifteen to twenty stools a day, usually consisting of blood and mucus. Since this form of obstruction occurs chiefly in children, one must keep such a possibility in mind whenever abdominal pain accompanied by symptoms of shock or collapse appear suddenly in a child. Rectal and abdominal examination for a possible tumor must be made at intervals of a few hours. Inability to secure a satisfactory bowel movement and the passage

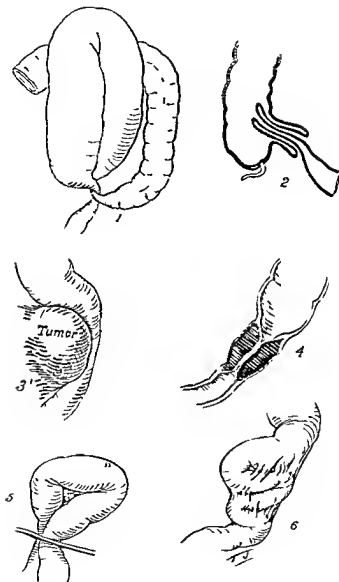


Fig. 347

of flatus in suspected cases (even if the abdomen is not distended and there is a history of passage of frequent small stools) should lead to a search for this form.

In the other varieties of ileus you must always suspect the existence of an obstruction to the fecal current or to the circulation of the gut wall when the three cardinal symptoms, vomiting, obstipation, and abdominal distention, steadily increase in severity if one can exclude the influence of morphin. Search for a possible cause includes the history of a previous operation, existence of an external hernia, history of gall-stone attacks, etc. It is impossible to differentiate an intestinal obstruction from a case of advanced peritonitis because the symptoms are identical, the rigidity usually present in an early peritonitis having disappeared so that the abdomen is now as soft as it would be in an obstruction case. In the early hours, however, there is much more rigidity in a case of spreading peritoneal infection and abdominal distention and vomiting are far less marked features than in a case of ileus of similar duration.

Large Intestine (Except Cecum and Appendix) —The acute affections of this structure include (a) sigmoid diverticulitis (b) volvulus and other forms of ileus (c) inflamed rectal diverticulum (d) enterocolitis. Since inflammation of the diverticula of the rectum cannot be distinguished clinically from those of the sigmoid these conditions will be considered together. The symptoms of the various forms of ileus of the large intestine are indistinguishable from those of the small intestine hence the description given in the previous section applies to the large intestine as well. Enterocolitis requires no special mention as its symptoms are so well known. Let us now consider the principal conditions of the large intestine which can give rise to acute abdominal symptoms viz.

Sigmoid Diverticulitis —This is a condition in which multiple

Fig. 347—Ileus. Diagrammatic representation of six different forms: 1. Volvulus of the sigmoid; 2. ileocolic intussusception; 3. structure of intestine due to extrinsic cause (tumor); 4. structure of intestine due to intrinsic cause (syphilis, carcinoma, tuberculosis); 5. strangulation by a band; 6. obstruction due to adhesions with resulting linking of adjacent coils.

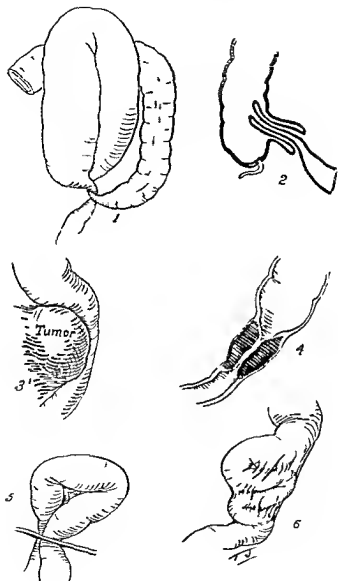


Fig. 347

tive changes around the diverticulum which results in marked thickening of the gut wall so that in recurrent cases there is much resemblance to a neoplasm. In fact in 31 of 42 cases recently reported by W. J. Mayo¹ malignant disease coexisted. Such a peridiverticulitis leads to thickening and stenosis of the bowel, and is often the cause of the recurrent acute symptoms. Recently²

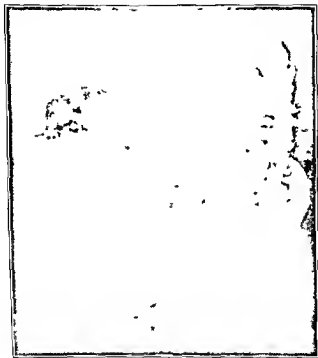


Fig. 349.—Symptomatic diverticulum of the sigmoid. (Collected papers of the Mayo Clinic 1917.)

it has been possible to make a diagnosis of the existence of a diverticulitis by a ray examination (Figs. 349 and 350)

¹ Jour Amer Med Assoc 1917 69 781

² The most important recent contributions to this subject are those of W. J. Mayo (Jour Amer Med Assoc 1917 69 781) H. W. M. Telling (Brit Jour Surg 1916 4 468) and Carman and Miller (Monograph on x Ray Diagnosis of Alimentary Tract 1917)

diverticula or pouches form usually in two rows (Fig. 348) on the convexity of the gut. They are hernial protrusions of all of the coats of the gut (true diverticula) or more frequently only of the mucosa and serous layers. The orifices of communication with the lumen of the gut are quite small and thus favors ac-

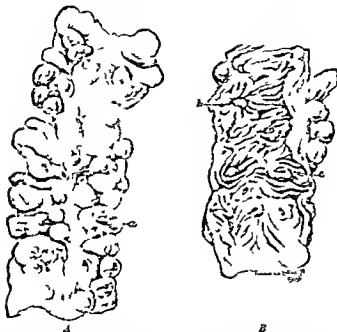


Fig. 348—Diverticula of cecum of rodent. *A* The fat has been dissected from the outer aspect of the bowel. The pouches open for the most part into the appendices cecales. One of the sacs is laid open at *a*. *B* Inner surface of the bowel from the same specimen. A concretion is seen at *b* protruding at the orifice of one of the diverticula. At *c* the flapped orifice is well seen. From drawing kindly loaned by W. H. Maxwell Telling, of Leeds, England.

cumulation of fecal material, etc. in the pouches. The pathologic changes subsequent to such retention are quite similar to those in an inflamed appendix, viz. acute inflammation up to gangrene, perforation into the free peritoneal cavity and abscess formation. A striking difference, however, is the greater tendency to prolifera-

frequently there is a history of recurrent attacks. The pain is seldom accompanied by vomiting.

(b) *Tenderness and rigidity*. These are extremely frequent and confined to the left lower quadrant.

(c) *Tumor*. This has been noted in 30 per cent of the cases according to Telling, lying just above and parallel to Poupart's (left) ligament in a sausage like manner. It may appear and disappear and such a recurrent tumor is an especially diagnostic feature.

(d) *Abscess formation*. This occurred in 28.8 per cent of the cases collected by Telling and must be suspected if there is fever and leukocytosis. At times rectal examination may reveal a bulging and perirectal abscesses having a sigmoid diverticulitis as their source may originate from this condition. We must always think of a possible diverticulitis and peridiverticulitis as the cause of acute left sided abdominal symptoms in obese middle aged patients. In the Mayo series of 42 cases only one or two diverticula were as a rule responsible for the condition. The history of recurrent pain in the left lower quadrant with or without symptoms of obstruction is especially characteristic of these cases.

Cecum and Appendix—Under this heading I have included not only appendicitis but primary non malignant inflammation of the cecum, carcinoma of the appendix or cecum with acute symptoms and also acute infection of the ileocecal lymph nodes. In regard to the first named condition to which the old term typhlitis still clings I simply mention it because one finds cases from time to time where the clinical picture has been that of an acute appendicitis but the appendix itself shows relatively few macroscopic changes while on the other hand the cecum shows all the evidences of an intense inflammatory reaction. These cases are extremely rare and cannot of course be differentiated before operation from the ordinary acute appendicitis. My reason for including carcinoma of the appendix or cecum in a lecture on acute abdominal affections is that both conditions probably as a result of a secondary infection with pyogenic organisms at times masquerade under the clinical picture of

Although diverticula are found anywhere in the alimentary canal from the esophagus to the anus, we are chiefly interested in the present lecture with those of the large gut. They occur here in the cecum and may even be confined to this region, less frequently are they encountered in the ascending and transverse colon. They are again less numerous in the descending colon.

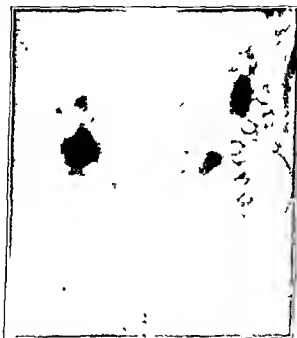


Fig. 350—Symptomatic diverticula of the sigmoid (Collected papers of the Mayo Clinic 1916)

until the sigmoid is reached and here they are most numerous. In the rectum they rarely occur.

Clinically we are chiefly interested in this lecture in the acute inflammatory group which according to Telling constitutes the largest number of cases. The principal symptoms are (a) Pain, referred in most cases to the left iliac fossa. There may be only a single attack as in the acute or gangrenous but more

sis is seldom made before operation unless the glands are palpable as is at times the case in children through the abdominal wall

Appendicitis —It is impossible in a clinical lecture in which we must consider all the acute abdominal conditions to discuss in detail a disease whose principal features are familiar to all of you. The order of appearance of the symptoms in a typical case is as follows

(a) *Pain* —This is colicky in character, often quite diffuse or localized around the umbilicus but within a few hours localized in the right iliac region

(b) *Nausea and Vomiting* —This is reflex in the early stages and if it persists one must always suspect the development of a peritonitis

(c) *Local Signs* —Careful palpation of the entire abdomen will show a little marked rigidity and tenderness located in the right lower quadrant, the maximum intensity of which is confined to a point midway between the umbilicus and the anterior superior spine of the ilium. If one watches a case and re-examines it at intervals of a few hours and notes that the rigidity and tenderness have spread beyond the right iliac region toward the median line and toward the left of it as well as in an upward direction the development of a peritonitis must always be suspected

(d) *Temperature* —Always present and I can warmly recommend taking the same per rectum as I have found at times in these acute abdominal cases a difference of two or three degrees between the rectal and mouth temperatures

(e) *Pulse* —The pulse varies in intensity in proportion to the severity of the infection and its spread beyond the walls of the appendix. Although it shows but little change in the early stages a rapid rise is characteristic of an incipient peritonitis

(f) *Blood Count* —With the exception of cases of an extremely fulminant character an increase in the number of white cells and a rise in the polynuclear count is always present. Hewitt in a recent article¹ after a careful investigation of a large number of cases finds that the high white blood count when associated with a rise in the percentage of polynuclears is of great value. In

¹ Ann Surg, 1917 56 150

acute appendicitis, and one is quite surprised at operation to find malignancy present. On two occasions during the last few years I have operated upon cases which apparently had the classical symptoms of acute appendicitis, and was quite surprised when the pathologist reported the presence of a carcinoma of the appendix. Quite recently I saw a case of a similar nature in consultation with a prominent internist. An old gentleman of eighty four presented a mass in the right iliac region which seemed fixed, but was very tender and was accompanied by high temperature and white blood count. Operation revealed the presence of an appendiceal abscess secondary to a gangrenous appendix the latter showing at its base a carcinoma which extended up into the wall of the cecum. We know, of course that the majority of these carcinomata of the appendix are relatively benign are generally circumscribed and metastasis is rare, but it is well enough to be ready for such surprises in cases presenting acute symptoms.

In regard to acute infections of the ileocecal lymph nodes I only wish to say that the group which is due to the ordinary pyogenic organisms presents symptoms which are indistinguishable from those of an acute appendix and it is only at operation that one notes the enormous enlargement of the ileocecal lymph nodes which seems out of all proportion to the visible inflammatory changes in the appendix. There are however cases of acute tuberculous enlargement of the ileocecal lymph nodes whose existence was not deemed possible until Gerard Marchant¹ reported such a case in 1900 and similar cases were published by a number of French writers and also by myself in 1909.² In

acute caseous changes in the same enable one to make a diagnosis of an acute tuberculous invasion. Both the pyogenic and tuberculous acute enlargements of the ileocecal lymph nodes masquerade under the clinical picture of an acute appendix and a diagno-

¹ Bull. et. mem. Soc. de chir. de Par. January 24 1900.

² Jour Amer Med Assoc., 1909 52 791

toms of appendicitis in a normally located appendix let me call your attention to the difficulty of diagnosis when the appendix is attached to a non rotated cecum (Fig 352) and also of the acute inflammatory symptoms which persist in the right upper quadrant instead of the right lower quadrant. Again let me recall those cases where the appendix points upward and outward along the outer or posterior surface of the ascending colon—

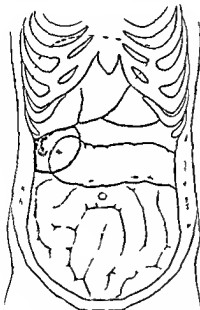


Fig 352 —Location of a subhepatic appendiceal abscess due to non rotation of cecum. Appendix pointing up and toward liver (Essendrach's Surgical Diagnosis.)

is the retrocecal appendix (Fig 351). Here the inflammatory symptoms are often most marked in the right ileocolic space instead of the right iliac region and simulate very closely a perinephritic inflammation or an intrarenal infection. Again we must remember the possibility of the appendix being attached to a cecum which is so movable that it is either drawn over to the median line (Fig 354) or even as far as the left iliac

fulminating or moribund cases or where there is a walled-off abscess leukocytosis is frequently absent.

(g) *Tumor*.—In the early stages, first thirty-six to forty-eight hours, when the rigidity and tenderness are quite marked, it is impossible to palpate a tumor mass. It is only at a later period

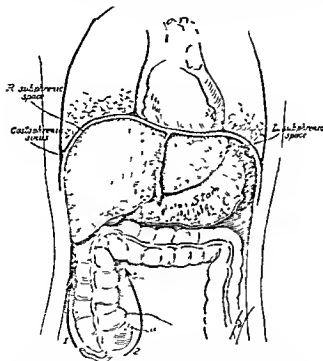


Fig 331 — Retrocecal appendix. Topographic relations of the organs of upper abdomen to those of thorax. Arrows indicate how infection travels along outer or inner edge of ascending colon from appendix to subphrenic space. (Surgical Clinics of Chicago, October, 1917)

when an encapsulated abscess is present or the appendix is surrounded by adhesive omentum that one can palpate a tumor. Hence, it is seldom necessary to resort to this method of diagnosis, *i e*, palpation of a tumor.

Having given you briefly some of the more prominent symp-

appendix lies in close relation to the ureter. The hemorrhage occurs either from extension of the inflammation from the appendix to the ureter or from adhesions. The French writers have given this form of hematuria a special name—*appendicite hématurique*.

In a previous lecture I have directed attention to the most important complications of appendicitis, and only wish to refer here

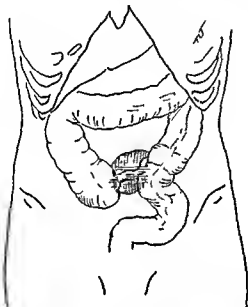


Fig. 354.—Location of appendiceal abscess in case described in clinical lecture. The cecum has been drawn over to the median line and the appendix was adherent to the mesosigmoid, the sigmoid also being drawn over to the median line. The walls of the abscess cavity (indicated by shaded area) were thus formed by the appendix, mesosigmoid, sigmoid and adjacent coils of ileum.

briefly to peritonitis. You must always suspect the development of such a complication when the tenderness and muscular rigidity gradually extend over the entire abdomen and are accompanied by a noticeable increase in the degree of abdominal distention and vomiting. When these local symptoms—diffuse rigidity and a tenderness and gradually increasing abdominal distention—are

fossa. In children and not so rarely in adults the appendix points downward and inward toward the floor of the pelvis and in females inflammation of such a pelvic appendix simulates a salpingitis. I have already directed attention to the possibility of the combination of a pelvic appendiceal abscess in such cases (Fig. 354) and of intestinal obstruction. And not infrequently after the removal of the appendix and the draining of the ac-

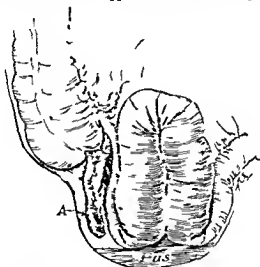


FIG. 354—A form of intestinal obstruction which may complicate acute appendicitis when appendix is in true pelvis and coils of terminal ileum become agglutinated and lie in pile. In these cases the abdominal distention, vomiting and inability to pass feces or flatus is not relieved by the removal of the appendix and drainage of the abscess. *Surgical Clinics of Chicago*, October, 1911.

companying abscess the symptoms of ileus persist as the result of the agglutination and the linking of the coils of the terminal ileum surrounding the appendix. This pelvic position of the appendix is of especial importance in children, as tenderness is often absent at McBurney's point and only present over the pelvis. Hence rectal examination should never be omitted in children.

Another feature of appendicitis to which I wish to direct attention is the possibility of the occurrence of hematuria when the

acute inflammatory changes and were greatly surprised when four days after operation there were unmistakable symptoms of a generalized peritonitis as well as of a pneumonia. The patient died about one week after operation and the autopsy revealed no cause for the peritonitis at the seat of operation. The lungs showed a typical diffuse bronchopneumonia the left pleural

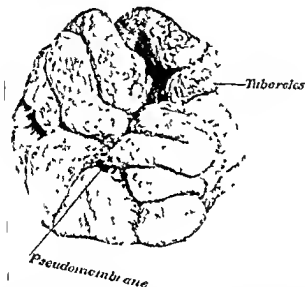


Fig. 359.—Coil of intestine in a case of tuberculous peritonitis. The label pseudomembrane leading to a cross shows how these false membranes bind the different coils of intestine to each other. The serous surfaces of the various coils show innumerable tubercles covered by this false membrane. (Fisenkrath's Surgical Diagnosis.)

cavity pericardium and entire peritoneum showed a wide spread pneumococcus infection. The peritonitis in this case was only a portion of a most severe generalized infection. The cases in which the pneumococcus peritonitis symptoms predominated in the clinical picture were not recognized as a distinct clinical entity until a short time ago but it is important to bear this acute

A very valuable contribution to the subject will be found in the article of Parker Syme *Annals of Surgery* 1918 67 263 from which I have quoted freely

accompanied by an inability to secure the passage of flatus or feces and persistent vomiting with a rapid increase in the pulse rate, you must be prepared to find that the infection is spreading to all portions of the peritoneal cavity. In very septic cases the pulse is extremely rapid and the temperature and white blood count low, and even rigidity may be absent. Search for evidences of free fluid or for absence of liver dulness is a waste of valuable time, as these symptoms are so uncertain as to be of practically no diagnostic value.

Before leaving the subject of appendicitis let me mention briefly typhoidal inflammation of the appendix. In many cases the predominance of the symptoms of typhoidal infection of the appendix obscures the underlying disease, and it is only when the surgeon finds that the temperature is out of proportion in its height to the local symptoms and the leukocytosis is low that a typhoidal appendicitis is suspected. In the majority of cases that I have seen it was only the persistently high temperature after the removal of the appendix that led to the suspicion of a typhoid and a hasty search for the Widal reaction.

Peritonitis is always secondary to some infective focus (a) either in an extra abdominal structure or (b) to an inflammatory process in one of the intra abdominal viscera. In the first group we include as its most important member the peritonitis due to the pneumococcus. In the second group are included cases of peritonitis which develop as the result of a primary infection e. g., in the alimentary or genito-urinary tracts or rarely by extension from the thoracic cavity. Peritonitis secondary to extension from an inflamed viscus has been described in connection with its occurrence in appendicitis, and any further reference seems superfluous.

Pneumococcus Peritonitis—This may occur either as a local manifestation of a generalized infection of the lungs pleura joints endo- and pericardium, etc., or, more frequently, as the chief point of localization of the pneumococcus; i. e., the only locus which gives rise to clinical symptoms. I recall a very important case belonging to the former group which occurred in this hospital during the past winter. We removed an appendix which showed

I cannot leave the subject of peritonitis without referring briefly to two features which are of more than passing interest. There can no longer be any question that peritonitis arising from an appendicitis or from a diverticulitis may at times be found without a visible perforation of the structure from which the peritonitis has unquestionably had its origin. Noetzel¹ Hirschel²

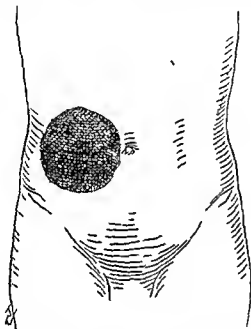


Fig. 356—Circumscribed area of dullness (shaded area) in one of author's cases of encapsulated tuberculous peritonitis with apparently acute clinical course.

Sprengel³ and myself⁴ have reported a number of such cases of peritonitis without visible perforation of the appendix.

I desire also to call your attention to a similar condition which exists in relation to the gall bladder. Buchanan⁵ has recently collected 16 cases including one of his own in which a biliary

¹Beitr. z. klin. Chir. vol. xlvii.

²Ibid. vol. lvi.

³Deutsche Chir. volume upon Appendicitis, p. 27.

⁴Amer. Jour. of Surg. December 1908.

⁵Surg. Gyn. and Obst. 1913, 26, 303.

condition in mind when we examine a child with severe peritoneal symptoms. The disease affects especially children and girls oftener than boys. It may occur as (a) an exclusively local condition (b) as a sequel of a similar infection elsewhere (lungs, pleura, ear, etc.), or (c) as a part of general peritoneal sepsis. There are two forms—(a) the diffuse and (b) the encapsulated. The onset is always sudden with evidences of extreme toxemia such as vomiting, diarrhea, cyanosis, very high fever and white blood count. One should always be suspicious of a peritonitis accompanied by diarrhea. There is a notable absence of local symptoms such as rigidity and tenderness as compared to the peritonitis complicating an appendicitis. The encapsulated form (Fig. 355) is far easier to recognize than the diffuse form, and is amenable to operation which is contraindicated in the diffuse form.

There are two other forms of peritonitis which give rise to acute clinical pictures viz. gonorrheal and tuberculous (Fig. 356). The former is very rare as a diffuse process and must be thought of when the usual signs of a generalized peritonitis accompany or supervene upon an acute pelvic infection in the female. In regard to tuberculous peritonitis the view held by many surgeons that this condition invariably begins in a slow insidious manner must be changed. There are a rapidly increasing number of cases in which the signs of a tuberculous peritonitis either appear in an acute manner following an attack of appendicitis or salpingitis or in a subacute one with continued high fever, great prostration and abdominal distention greatly resembling a typhoid in its course but being in reality a severe tuberculous peritonitis with early caseation of the mesenteric lymph nodes. I have already referred to the acute mode of onset in some cases of a tuberculous appendicitis with extensive invasion of the ileocecal lymph nodes and the same is true of a primary tuberculous tubal infection. We must constantly bear these possibilities in mind in cases in which there are evidences of free or encapsulated exudate (Fig. 356) and the history of a sudden onset with pain, fever, and the local signs of an acute abdominal crisis such as localized rigidity and tenderness.

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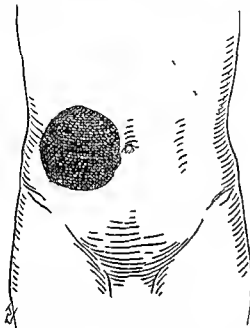


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³ Deutsche Chir., volume upon Appendicitis, p. 277.

⁴ Amer. Jour. of Surg., December 1908.

⁵ Surg., Gyn., and Obst., 1918, 26, 303.

peritonitis was found at operation without visible perforation of the gall bladder. The bile undoubtedly passes through the gall bladder wall by a process of filtration.

Acute Affections of Genito-urinary Tract.—Among those which I have mentioned in my previous lecture are

- (a) Acute infections of kidney, perinephritic tissue and ureter
- (b) Renal and ureteral calculi
- (c) Dietl's crises (kinking of ureter in movable kidney)
- (d) Strictures of the ureter with infection.
- (e) Tumors of the kidney (with fever)
- (f) Acute inflammation of the intra abdominal portion of the vas deferens
- (g) Torsion of testes

We will only be able to consider the most important clinical symptoms of these affections. Let me again direct your attention to the necessity of a thorough knowledge of the principal diagnostic methods which the urologist of today employs in order to differentiate the various diseases of the urinary tract in both sexes. I refer particularly to urethroscopy (anterior and posterior) cystoscopy, ureteral catheterization, ordinary or stereoscopic x ray examination of the urinary tract combined or not (as the individual case requires) with pyelography and finally the use of x ray catheter. By observing in this manner (a) the appearance of the interior of the urethra and bladder (b) by obtaining cultures and specimens for ordinary microscopic and chemical examination of the urine from each kidney (c) by a study of the size and outline of the ureteral lumen and renal pelvis with thorium and (d) by the interpretation of shadows in relation to the x ray catheter we can make a diagnosis of which particular lesion of the urinary tract is present. In other words I wish to impress you with the fact that the clinical history and our physical examination of the patient without the use of the above more accurate methods will only enable one to make a diagnosis in a relatively small proportion of cases.

Let us now discuss briefly the chief diagnostic features of the acute affections I have mentioned.

(a) *Acute Infections*—The organisms or their toxins are carried to the kidney, (a) through the blood current (hematogenous route—Fig 357), (b) through the lymph vessels of the ureter (lymphogenous route), or (c) finally by way of the urinary stream, i. e., through the ureteral lumen from the bladder

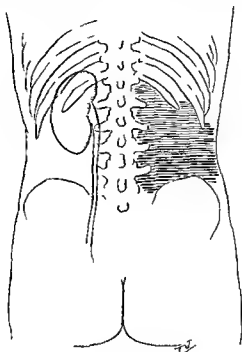


Fig. 357.—Posterior view of kidney showing the relation to the spine.

Either the pelvis parenchyma or perinephritic tissue may be involved alone but more frequently there is an extension of the infection from one to the other. Clinically we may divide infections of the upper urinary tract into (a) those with localizing symptoms such as pain, tenderness, rigidity, enlargement of kidney, etc.

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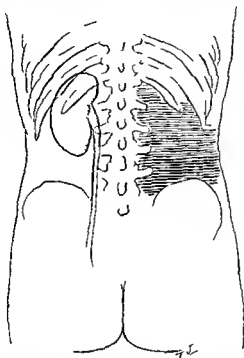


Fig. 357—Posterior view of body showing on the left side the position of kidney and ureter as projected on surface of body. On the right side the shaded area indicates the typical location of tenderness and rigidity in the ileocolic space in acute infections of the kidney and occasionally in retrocecal appendicitis.

Either the pelvis parenchyma or perinephritic tissue may be involved alone but more frequently there is an extension of the infection from one to the other. Clinically we may divide infections of the upper urinary tract into (a) those with localizing symptoms, such as pain tenderness rigidity enlargement of kidney, etc

DANTE M. FISCHDRATH

It is not employed as it is only
an irregularly recurring chill high fever and
is frequently seen in cases of acute pro-
nounced during pregnancy and in the post-
partum state of one of my cases of protracted
lactation with the most extreme
There are also stated in the literature
as the source of infection and as
a source of infection in the post-
partum state.

John W. Bush

[illegible]

Handwritten musical notation on a five-line staff. The notation includes various notes, rests, and a key signature change to one sharp (F#). The handwriting is in ink and appears to be a personal sketch or study.

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Puerperal pyelitis treated by lavage of the renal pelvis

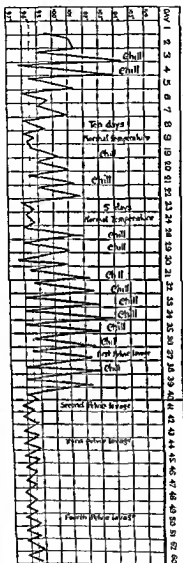


Fig. 359.—Temperature chart from a case of puerperal pyelitis illustrating how the clinical pictures of a most severe generalized sepsis may be caused by an infection of the kidney with practically no localizing signs

ately affected the fever is very apt to be of the intermittent type, each rise of temperature being preceded by a chill and followed by a sweat. This has given rise to the term "pseudomalarial type

(b) Those *without* localizing symptoms In the first named group the attention of the physician is directed to the possibility of a kidney infection by the complaint of pain referred to one of the upper quadrants of the abdomen and to the ilio-costal space of one or both sides (Fig. 358). On examination we usually find more or less tenderness and rigidity, and often the enlarged kidney can be palpated.



Fig. 358—Appearance of surface of the kidney in acute hematogenous infection (pyelonephritis). Note large number of miliary abscesses each one of which is surrounded by an intense zone of hyperemia.

Fever is an almost constant accompaniment of acute renal infections. It may be of the continuous type and if there are no localizing signs and it is accompanied by symptoms of generalized sepsis an erroneous diagnosis of influenza typhoid central pneumonia etc., is not infrequent. When the infection predominates in the renal pelvis and the parenchyma is only moder-

kidney, as is shown in the temperature chart (Fig 360), may cause high temperature and simulate an acute renal infection, or, as in the case whose temperature chart is shown in the illustration, may simulate retrocecal appendiceal abscess. In this connection let me call your attention to the mixed infection where pyogenic organisms like the staphylococci or the colon bacilli are added to a tuberculous infection of the kidney (Fig 361), and the acute symptoms of a renal infection due to the pyogenic organisms completely obscures at first an underlying tuberculous

Mixed Tuberculous and Pyogenic infection

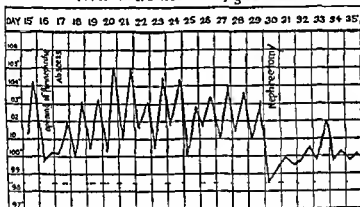


Fig 361—Temperature chart from case of perinephritic abscess due to mixed tuberculosis and pyogenic infection of the kidney. Temperature persisted after operation of perinephritic abscess until kidney was removed.

infection. I have recently called attention to these cases,¹ and the surgeon must always suspect such a combination if the temperature does not drop after opening a perinephritic abscess.

Ureteral colic is not at all a typical symptom of renal infection but may be present at times as practically the only symptom of renal infection, accompanied by a slight rise of temperature. I shall refer to this again under colics due to ureteral calculi. The study of the urine alone is of little value in localizing a urinary infection. This localization must be done with

¹ The Diagnosis and Treatment of Tuberculosis of the Kidney, Illinois, Med Jour, August 1918.

of pyelitis," a term which should not be employed as it is only confusing. Such an irregularly recurring chills, high fever, and sweat combination is frequently seen in cases of acute pyelonephritic infection in children during pregnancy, and in the puerperium. Figure 359 is from one of my cases of puerperal pyelitis which was seen in consultation with the most excellent internists and obstetricians. There were absolutely no localizing symptoms pertaining to the kidney, as the source of infection and the elimination of the genitalia as a source of infection led to the tenta

Tumor of Kidney with high fever

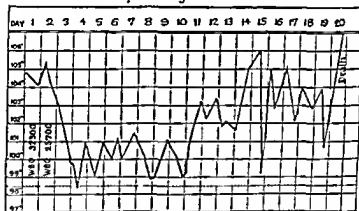


Fig. 360—Temperature chart from case of sarcoma of the kidney in child of four with high fever simulating appendiceal abscess. (Case of Dr. Lawrence.)

tive diagnosis of a septic endocarditis. It was only after a careful cystoscopic examination and the ureteral catheterization with cultural study of the urine that a diagnosis was made of right sided pyelitis and the subsequent treatment of the infection with lavage of the renal pelvis was followed by a prompt drop in the temperature and complete recovery.

found that pain was referred largely to the kidney in 67 per cent to the upper abdominal quadrant in 15 per cent and to the region of the lower ureter or bladder in 11 per cent (Fig 362) No definite radiation of pain was observed in 5 per cent and no pain whatever in 2 per cent We thus see that the symptoms of a fixed pain in ureteral calculi independent of colicky attacks is distributed over such a wide area in the abdomen that there

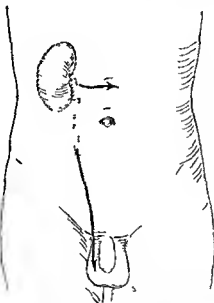


Fig 362 —Most frequent directions in which pain due to ureteral colic radiates Heavy arrow indicates typical radiation toward testes or bladder Short arrow indicates less frequent radiation toward front of abdomen and toward median line

is no characteristic localization or radiation The fact that ureteral calculi can be present for many years without giving rise to any symptoms at all makes it incumbent upon us to study the urinary tract in every thorough examination of the abdomen especially when there is a history of colics fixed or radiating pain or of microscopic or macroscopic hematuria It is only through the employment of some or all of the methods of diagnosis which have been developed in the special field of urologic

the use of various diagnostic methods which I have mentioned before. At the same time let me warn you against ureteral catheterization during an acute stage if obstruction is present. It is better if there is no urgent indication to refrain from this procedure until a latent stage has been reached. It was formerly taught that one could differentiate an infection of the renal pelvis at least of the upper urinary tract from the lower urinary tract by the presence of small long tailed epithelial cells with relatively large nuclei but we now know that this is of absolutely no value as the same cells may occur in infections of the lower urinary tract.

(b) *Colics Due to Renal and Ureteral Calculi*—This subject has developed so rapidly during the last ten years since the systematic use of the x ray in obscure acute affections of the abdomen that I can only mention some of the principal features.

Ample experience has taught us that the syndrome known as renal colic with its radiations of pain to the testis and lower urinary tract, was formerly regarded as almost pathognomonic of ureteral lithiasis. Further experience has shown that any lesion which will suddenly cause an increase in intrarenal tension will give rise to the identical group of symptoms. Typical renal or more correctly ureteral colics are now known to be seen (a) when particles of tumor mass escape into the ureter (b) when blood-clots or pus detritus are passed from the renal pelvis into the ureter (c) in cases of renal or ureteral infection (d) in nephritis (e) in appendicitis when the ureter is in close proximity to the inflamed appendix (f) in tabes (g) in strictures of the ureter whether of congenital or acquired origin (h) in kinking of the ureter as observed in cases of movable kidney or compression of the ureter¹ by an accessory artery to the lower pole of the kidney. Nor does the symptom of fixed pain over the kidney or along the course of the ureter fare any better. In a recent analysis of the symptoms of a large number of cases of ureteral calculi from the Mayo Clinics Braasch and Moore

¹ I have recently reported a typical example of such a cause of ureteral colics (SURGICAL CLINICS OF CHICAGO February 1918 p 95)

² Jour Amer Med. Assoc. 1915 65 1234

is bent at a sharp angle resulting in severe pain accompanied by vomiting etc resembling in every particular a colicky attack due to a ureteral calculus (see previous section) A very characteristic finding is the presence of a considerable enlargement of the kidney as a result of the temporary obstruction of the ureter during the attack (Fig 363) The presence of blood in the urine is of course not at all diagnostic of this condition as it may be present in many other causes of ureteral colic In the interval between attacks it is comparatively easy to make a diagnosis of the underlying condition by filling the lumen of the ureter and pelvis with some solution which is not penetrated by the x ray so as to obtain an accurate picture of the position of the kidney in a horizontal and upright posture of the patient and of the size of the renal pelvis This diagnostic method is known as ureterography or pyelography and is absolutely without danger if a liquid like thorium is allowed to flow in by gravity

(d) *Strictures of the Ureter with Infection*—In a previous lecture I have directed your attention to the various causes of strictures of the ureter¹ and will ask you to refer to this for detailed consideration of the subject I only wish to call your attention with the present clinical case to the fact that such strictures not only give rise to repeated acute attacks of ureteral colic but also to persistent enlargement of the kidney i e a hydronephrosis which may or may not be infected

(e) *Tumors of the Kidney with Fever*—I have referred to this rather rare condition in connection with the subject of acute infections of the kidney and only mention it again to ask you to bear it in mind in the differential diagnosis of obscure cases

(f) *Acute Inflammation of the Intra-abdominal Portion of the Vas Deferens*—This condition may at first glance seem rather to have been wrongly included in this subject of the acute abdomen but I have seen a number of cases of acute gonorrheal epididymitis in which there were such marked lower abdominal symptoms in the first twenty four to forty-eight hours that the thought arose in all of the patients that we were dealing with

surgery in the past ten years that we are able to differentiate the various diseases of the urinary tract which can give rise to symptoms identical with those of ureteral calculi.

It is not infrequent for ureteral or renal calculi to be the cause of a most severe clinical picture of acute sepsis without

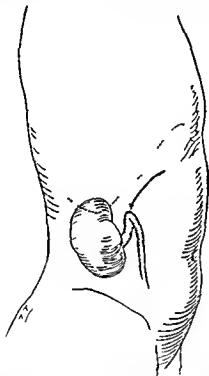


Fig. 363—Lateral view of abdomen showing how ureter can be kinked by movable kidney causing intermittent hydronephrosis and the clinical syndrome known as Dietl's crisis

any suspicion of their presence manifesting itself by pain or history of colics

(c) *Dietl's Crises*—This is a clinical syndrome which was first described by Dietl in which as a result of the extreme range of motion of a movable kidney the ureter becomes kinked

tiate a salpingitis from an appendicitis unless vaginal and rectal examinations show that the inflammatory disturbance is limited to the right side of the pelvis

The early stages of extra uterine pregnancy before rupture of the tube or a tubal abortion may simulate an attack of appendicitis on account of the sharp colicky pain due to the distention of the tube manual vaginal examination will clear up the diagnosis in the majority of cases After rupture has occurred the symptoms of internal hemorrhage predominate and there are very few non traumatic conditions which simulate the clinical picture of a ruptured extra uterine pregnancy or abortion in the first twenty four to forty eight hours If however the case is not seen until after the hemorrhage has occurred the diagnosis is not so easy This is due to the fact that the patient has recovered to a great extent from the acute anemia Furthermore the presence of a considerable quantity of free blood in the peritoneal cavity will give rise to a leukocytosis simulating that of a true infection e g appendiceal When a condition of moderate paralytic ileus ensues with the abdominal distention inability to secure the passage of much flatus and the generalized tenderness in such late cases frequently simulates either an early peritonitis or intestinal obstruction

I have directed your attention to this picture of the late stages of non operated cases of extra uterine pregnancy because I find

ate again the various causes which we must think of outside of the abdomen which can give rise to acute symptoms (1) referred pain from thoracic conditions (2) nervous system (3) hysteria

(1) *Thoracic Conditions*—Cases of both pneumonia and pleurisy occur in which there is complaint of severe pain in the abdomen at the onset of the disease This is especially true in children There may be rigidity of the abdominal muscles on the side affected In pneumonia there is a history of a chill The acute onset is followed by dyspnea and marked increase in

an acute appendicitis accompanying an acute attack of gonorrhea until the swelling of the epididymis cleared up the diagnosis

If you will recall the manner in which the infection of the genital tract in the male spreads from the urethra to the epididymis by way of the seminal vesical and vas deferens it will not be difficult to understand why such acute symptoms may arise from symptoms of the (intra abdominal) extraperitoneal portion of the vas deferens

(g) *Torsion of Testis*—The torsion of the spermatic cord can of course only occur in cases of non-descent of the testis but you must think of such a possibility when acute abdominal symptoms accompany a painful irreducible swelling in the inguinal region

Internal Genitalia of the Female—This subject is so thoroughly covered in all the standard text books on gynecology that I need only mention some of the principal conditions of the internal genitalia which may give rise to symptoms simulating those of other acute abdominal conditions

The torsion of the pedicle of an ovarian cyst or a pedunculated fibroid of the uterus greatly simulates in its early stages an attack of early appendicitis and this clinical picture becomes even more confused when the paralytic ileus which so frequently accompanies these cases begins. One must always suspect the possibility of such a gynecologic condition when acute abdominal symptoms appear in young girls or later in life when fibroids are so frequently found. To differentiate an acute pelvic infection giving rise to salpingitis ovaritis etc. from an appendicitis is not difficult if the cecum is located in its normal position because the pain rigidity and tenderness in acute pelvic infections in the female are located nearer the median line and above the inguinal folds while in appendicitis they are nearer the anterior superior spine and iliac fossa. When however the cecum is extremely movable or the cecum itself lies in the true pelvis as is so frequently the case or an appendix (see Fig 353) attached to a normally placed cecum extends across the iliac vessels into the true pelvis it is extremely difficult to differen

case will eliminate tumors of the cord or spinal column either of primary or secondary (metastatic) origin

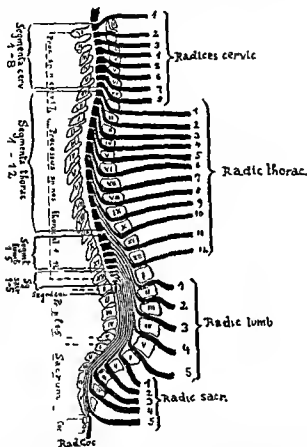


Fig 364 —Topographic relations of the segments of the spinal cord to the vertebral bodies spinous processes and nerve-root origins. This illustration (taken from Robert Bing's work) shows clearly how tumors of the spinal cord and neoplasms or inflammatory processes in the vertebra can give rise to acute abdominal pain

(b) *Tubes with Visceral Crises* —A recent paper by Nuzum¹

respirations and pulse-rate. The pain is seldom as well localized as in the acute abdominal conditions nor is the muscular rigidity as circumscribed and constant.

There is one form of pleurisy (diaphragmatic) which simulates acute abdominal affections very closely. J. A. Capps¹ gives the following as the main points of differentiation between diaphragmatic pleurisy and inflammation of the abdominal viscera. The skin and muscles of the abdomen are more sensitive to pain and touch in referred pleural pain than in visceral disease. This is elicited best by pinching the wall and scratching the skin. The cutaneous reflexes are more lively in referred pain as a rule. Deep pressure with the flat surface of the fingers is well borne in referred diaphragmatic pleural pain while it elicits a dull deep pain when applied over an inflamed organ. Evidences of respiratory infection usually are present in diaphragmatic pleurisy. Appearance of a sharp definitely localized pain in the neck on the same side as the abdominal pain often reveals the true condition as it points to irritation of the phrenic nerve. Referred pains in the neck and abdomen usually are induced or aggravated by cough and deep inspiration. Nausea and vomiting are more constant in visceral abdominal inflammation but may occur and be very pronounced in diaphragmatic pleurisy. Hiccup is not a common symptom in the latter; it is seen more often in visceral disease.

Objectively but little can be found and a differential diagnosis is difficult in the early hours. The case should be watched for several hours before a final diagnosis is made.

(2) *Nervous Symptoms*—(a) *Referred Pain from Spinal Conditions*—Spondylitis and tumors of the spinal cord or its membranes or of the vertebrae may cause severe abdominal pain which is referred to the terminal filaments of the spinal nerves of the corresponding segment in the abdominal wall (Fig. 364). The pain is seldom as acute as in true abdominal affections and is not accompanied by muscular rigidity or tenderness. Examination of the spine for evidences of spondylitis will soon exclude this cause. Examination of the nervous system and the history of the

¹ Amer. Jour. Med. Sci., 1916 151 333

early stage of mesenteric vascular occlusion The stool at times contains large quantities of blood

Remarks Upon Patient Presented at Beginning of Clinical Lecture—I am going to examine this patient again when he is under the influence of an anesthetic The abdomen has become very much relaxed but I feel a mass in the right inguinal region which extends over to the median line and downward to Poupart's ligament In an outward direction it extends to the right border of the right rectus muscle and in an upward direction almost to the umbilicus The surface of the mass is irregular and firm not very hard and is apparently not movable on the underlying tissues In other words it seems to be fixed

Exploration reveals the fact that we are dealing with a case of appendiceal abscess in which the extremely movable cecum has been drawn over to the median line A greatly inflamed vermiform appendix shows a perforation at its base opposite a phlebolith A generalized spread of the infected material has been prevented by a mesosigmoid which has come over to the median line near the level of the umbilicus

This case illustrates the difficulty in diagnosis in acute abdominal conditions when viscera are not in their normal position This case is especially instructive from a diagnostic standpoint because as my experience grows I have learned to consider many other conditions as possible causes of the acute surgical abdomen than we were formerly taught and I believe that it is advisable for every surgeon to familiarize himself with the various possibilities if he wishes to avoid the pitfalls of diagnosis

Nuzum has found that in the five years from 1910 to 1915 over 1000 cases of tabes dorsalis have been carefully studied in our Cook County Hospital and the conclusions arrived at are as follows

1 Of the 1000 tabetics 87 per cent have been subjected to laparotomy under mistaken diagnoses one or more times

2 The crises of tabes have largely influenced the surgeon in his decision to operate This statement is supported by the fact that 65 per cent of the 87 patients operated on presented visceral crises In 14 per cent of these the crises were the initial symptom of their disease

3 Mistaken diagnoses and resulting operations occur chiefly through failure to examine the nervous system

(c) *Hysteria* requires no specific description I only mention it here to ask you to keep even this condition in mind in the differential diagnosis of acute abdominal affections The experienced examiner will soon be able to differentiate real from feigned symptoms But on the other hand I have seen hysterical patients wrongly accused of simulation when a genuine acute surgical abdomen called for operative interference I recall one case in which a highly neurotic woman was thought to be feigning abdominal symptoms until the clinical evidences of an unquestioned generalized peritonitis presented

(3) *Inflamed Lymph-nodes* —I mentioned this condition in the previous clinical lecture¹ and were it not for the fact that I have encountered it in a large number of cases I would not refer to it again here The symptoms simulate completely those of an acute appendicitis and are most apt to occur in individuals who neglect to mention the presence of a primary atrium of infection in this territory from which the inguinal and deep iliac nodes receive their lymph.

(4) *Vascular Crises* —They occur in elderly people in the form of attacks of severe pain in the epigastrium They are due to an atheromatous condition of the vessels of the splanchnic area and must be differentiated from other acute abdominal conditions The attacks may be accompanied by diarrhea and simulate the

¹ *Complications of Appendicitis.*

CLINIC OF DR CHARLES LOUIS MIX

MERCY HOSPITAL

GASTRIC CARCINOMA

Summary A patient complaining of weakness pallor and loss of weight Demonstration of the method of differentiating carcinoma of the greater curvature

THE patient is a male sixty nine years of age who entered the hospital on the 19th of December, 1917, complaining of feeling very weak and of losing weight

Family History—He was born in Germany and came to Chicago forty years ago where he has since lived He has three brothers, all of whom are healthy and living There is no history of carcinoma in the family

Personal History—He is a brewer by occupation but despite the nature of his employment has always been temperate He has always been temperate both in the use of food and in tobacco

Previous History—He has always been in good health until six years ago when he had appendicitis and an acute perforation Notwithstanding the fact that he was sixty three years of age he was operated upon and made a complete recovery Before this attack of perforative appendicitis he had been bothered to some extent by gas and distress after eating but he had never had pain or vomiting After the operation for appendicitis his gas and distress after eating disappeared completely

Three years later, in November 1915 he caught cold and had wry neck for a few weeks From this he recovered perfectly Shortly after this attack he felt himself growing weak The weakness gradually progressed, and in the fall of 1916 he saw a doctor who made a diagnosis of pernicious anemia and

clear cells. Examination of the red cells shows only 2 000 000 to be present per cubic millimeter, and the hemoglobin is but 40 per cent. This indicates a color index which is slightly below unity and raises the presumption of a secondary anemia, notwithstanding the fact that he was treated for pernicious anemia in the fall of 1916 when he was given iron and arsenic without any benefit to himself. Examination of the red cells shows no nucleated reds to be present. There was no increase in the myelocytes. On the contrary the only noticeable thing about the red cells was the presence of poikilocytes and megalocytes. Such a blood picture is the blood picture of a secondary anemia though it looks very much like a primary anemia as far as the general appearance of the patient is concerned. When one comes to analyze the blood picture one finds that the condition must belong to the secondary group. You will also find in the differential examination of the white cells that the change of pernicious anemia is not evident. In pernicious anemia there is always a reduction of the polymorphonuclear cells and an increase of the small lymphocytes whereas in this patient if anything the polymorphonuclears are increased and the small lymphocytes are diminished. This is directly contrary to the findings of pernicious anemia and raises at once the presumption of a secondary anemia.

His blood pressure which was taken showed 94 mm. of mercury systolic and 56 diastolic with a pulse pressure of 38. This indicates again the large amount of secondary anemia which is present and which has resulted in quite a loss of vasomotor tone and myocardial weakness.

Examination of the urine showed a specific gravity of 1021 acid in reaction, there being no albumin or sugar and no casts or red blood cells present.

We are at once driven to some explanation for the presence of this very severe secondary anemia. It is quite evident that he must have somewhere about him a bleeding point or else that he has got some malignant disease. The blood differentiation is very evident. It does not come from any parasitic disease of the bowels because first there is no eosinophilia and

treated him for it. He was given iron and arsenic for quite a period of time without any material benefit. He kept on losing weight becoming more and more anemic and short of breath. On December 19, 1917, he entered Mercy Hospital in the service of Dr. Michael McGuire to whom we are indebted for the privilege of showing this case. At that time his only complaints were weakness, pallor and loss of weight. There was no complaint of pain or distress after eating. There was no vomiting of food or blood. There was no history of melena at any time and there was nothing in the bowel movements to indicate any parasitic disease. Venereal history was entirely negative.

On entering the hospital the notes of the examination state that the patient looked very pale with perhaps a little tinge of yellow in his skin which was doubtful. The skin appeared rather transparent and very movable on the underlying tissues due to the absorption of the subcutaneous fat. His lungs were entirely negative. There was a hemic murmur over the precordial region, but otherwise the heart was negative. Examination of the abdomen at entrance showed no definite swelling either on inspection or palpation. On the whole the abdomen was rather scaphoid. There was a rather large scar resulting from the appendicitis operation which had stretched and had permitted a slight amount of ventral hernia. No definite tumor could be made out in the abdomen on careful palpation and there was no tenderness. There was perhaps a slight rigidity in the epigastric region over the left rectus muscle. Neither the spleen nor kidneys were enlarged or palpable. Examination of the eyes, ears, nose, throat and teeth was negative.

DEMONSTRATION OF CASE

You will note that the patient is a large man somewhat emaciated, answering questions reasonably promptly and not appearing to be very sick. The most noticeable thing about him is his color which immediately prompts a blood examination. This shows 7000 white cells of which 78 are polymorphonuclear cells, 19 small lymphocytes and 3 large mononu-

68 normocytes per 100 cells This is not the picture of pernicious anemia, but the picture of secondary anemia You will note there was only 4 per cent of megalocytes, whereas in pernicious anemia the megalocytes are 40 per cent or more You will note also that the hemoglobin and erythrocytes are practically in normal relationship There were 2 504,000 red cells and 50 per cent hemoglobin

The finding of blood in the feces together with the gastric analysis led, of course, to the fluoroscopic examination of this individual, and when the fluoroscopic examination was made the whole case was greatly illuminated Before speaking, however, about the results of this examination I wish to say a few words in regard to the localization of gastric carcinoma Depending upon the location of gastric carcinoma is the symptomatology If the carcinoma lies in the fundus it almost invariably is located at the cardiac orifice It usually starts from the columnar cells which lie just within the junction of the esophagus with the stomach Many so called cancers of the esophagus in the lower portion are really cases of cancer of the stomach at the cardiac orifice, because on examination they will be found to be made of columnar epithelial cells Carcinomata situated in such a location can close in the surrounding tissues and produce a great deal of pain and are almost universally diagnosed as esophageal carcinomata They are usually very prone to bleed and lead, as a rule, to frequent and repeated hemorrhage They bear out the law of carcinomata everywhere of small repeated hemorrhages rather than a very rare large hemorrhage Often in these cases the blood comes up in small amounts through the esophagus and is vomited out by the patient

When the carcinoma is situated on the greater curvature the symptomatology is frequently very latent There have been numerous cases reported in the medical literature of operations in which the surgeons have been surprised to find a very large tumor of the greater curvature which was not suspected If the tumor mass is not very tense and if the abdominal wall is set rather firmly, so that palpation is not easy, these tumor masses are not infrequently overlooked I have known of instances of

second, there have been no ova found in the stools. It must come from some occult point. Had he lost the blood by nose bleed or by hemorrhages from the bowels or from bleeding piles he would be aware of it and would readily tell us. Evidently the loss of blood in his case is quite as occult to him as it is to us, and must be sought for. One of the first things to be done in such a situation is to examine the feces for blood. After a meat free diet this was done, and on the 21st occult blood was found positive, parasites and ova negative.

The presence of occult blood in the stools in an individual who is losing weight, sixty nine years of age, and extremely anemic ought to raise the possibility in one's mind of some malignant process. Consequently, a test meal was given the patient on the 21st of December, with the following result: total acidity, 16, free hydrochloric acid none, lactic acid a trace, occult blood strongly positive. Such a net of findings immediately raise in one's mind the question of the presence of an achlorhydria of pernicious anemia or an achlorhydria from malignant disease of the stomach.

Let us now note the course of his stay in the hospital. On the 19th of December he came into the hospital in a wheel chair with a respiratory rate of 24, temperature 97.8 °F, pulse 104. The next day his temperature remained subnormal all day, varying from 97.6° to 98° F, his respiratory rate from 18 to 22, and his pulse from 78 to 100. On the 21st of December his pulse varied from 80 to 82, showing the effect of rest in bed upon his myocardium. Subsequent to that date we find that his pulse range continued low, falling even as low as 62 on the 23d of December, again illustrating the value of rest. From that time until the present (January 9th) he has been doing reasonably well, being up part of the time sleeping fairly well, getting an occasional alcohol rub and taking his meals without a great deal of trouble. Today, on the 9th he has made quite a little improvement in the blood count. It shows 2,504,000 reds with 50 per cent hemoglobin. A differential count of the red cells, made especially so that we may have the results this morning showed 9 poikilocytes 4 megalocytes 9 microcytes,

about a year ago a similar case where the man went along with his carcinoma for a number of months and then, comparatively suddenly, he had a complete pyloric stenosis. Then rapid dilatation ensued, with comparatively early death.

One would say, then, from these considerations in the case of this man that a large carcinoma of the stomach is suspected by reason of the anemia, loss of weight and strength, and that it would be more likely that the carcinoma would be in a portion of the stomach where it would not give rise to symptoms as were it found in a portion of the stomach where it would give rise to a great deal of disturbance. Inasmuch as blood is found in the feces and has been found whenever looked for, it is evident that the loss of blood which this man complains of is due to bleeding from the carcinoma. This means then that if we find a carcinoma we have one which is a bleeding carcinoma with a raw surface opening into the stomach.

We are still further strengthened in the hypothesis of the probable presence of carcinoma by reason of the fact that the loss of weight in this patient's case has been quite considerable. In pernicious anemia loss of weight and subcutaneous tissue is the great exception and not the rule. Almost all the pernicious anemia cases maintain their subcutaneous fat, or at least have enough subcutaneous edema to give the skin a fairly normal appearance, whereas in carcinoma cases the complete absorption of subcutaneous fat usually leads to an appearance of quite intense emaciation. In this patient the complete absence of subcutaneous fat raises the presumption of the presence of carcinoma.

We are now in a position to tell you the results of the fluoroscopic examination and to show you the plates which were made on the same occasion. When the bismuth and buttermilk were given to him to drink, they passed down the esophagus without any trouble. They entered the stomach through the cardiac orifice and passed along the lesser curvature and started into the duodenum, very little remaining in the stomach. It seemed almost as though there were no stomach, the bismuth and buttermilk passing through a very patent pylorus which apparently

large tumor masses not being found on the greater curvature by physical examination but disclosed at the time of operation. If the carcinoma is located on the greater curvature it usually gives no symptoms on the part of the stomach. It does not apparently interfere very much with peristalsis. It does not ordinarily give rise to much pain until the stage of ulceration is reached and even then there may not be very much suffering attached to its presence. When the carcinoma is situated on the lesser curvature however it usually runs a very intense course. There is apt to be a great deal of vomiting a large amount of pain and considerable interference with gastric peristalsis. Usually carcinomata situated on either the lesser or greater curvature do not materially interfere with closing or opening of the pylorus. In fact carcinomata of the greater curvature are apt to result in a rather open pylorus whereas those on the lesser curvature depending on their location may or may not lead to secondary narrowing. If a lesser curvature tumor is located near the pylorus it of course will exert a certain effect upon it. When the carcinoma is situated in the antrum pylorici or at the pylorus it produces its worst effects. Usually in these cases it leads to a gradual dilatation of the stomach until the stage of marked stenosis is reached. These individuals may for a long period of time be able to get rid of the contents of their stomach in the natural way and then comparatively suddenly may get a severe pyloric blockade with a very rapid accumulation of fluid in the stomach so the organ becomes dilated to an enormous size. I remember on one occasion I was examining a patient at the County Hospital in the recumbent posture. He had what seemed to be a large abdominal cyst which extended as far down as the right iliac fossa. It occurred to me that the thing might be a dilated stomach. We put in a stomach tube and to our surprise we took out about a gallon of black water. It is needless to say that this patient had an almost completely occluded pylorus from a carcinoma and when I tell you that he died within three weeks time of an acute blockade which took place rather suddenly without much preliminary trouble you will not be surprised at the outcome. We had also in Mercy Hospital

for pernicious anemia which it was evidently thought that he had. Of course the findings of the blood do not bear out this diagnosis but on the other hand the negative statement from the point of view of his gastro intestinal canal and the negative findings in the abdomen indicate nothing of the presence of a carcinoma. Of course the error of supposing that pernicious anemia might be



Fig. 363.—Diagram of x ray plate showing filling defect on greater curvature and b mucin filled crater in the defect

present was one in which a man who was not very careful in his work might readily fall. As soon however as one begins to examine the blood picture he discovers that the case is one of secondary rather than primary anemia. Then the matter of a search for the cause of the blood picture becomes a matter of consequence. Taking into consideration that in pernicious

made no attempt whatever at contraction into a duodenum. From the fluoroscopic examination one would say without question that the pylorus was wide open and without function. The most important point therefore is the distribution of bismuth in the stomach and since that shows very nicely in the x ray plate we will ask your attention immediately to the two radiograms which were made. You will note in the radiogram that the stomach is somewhat large with a well-developed broad fundus. The stomach shows no stomach bubble. You will notice the little angle at the junction of the fundus with the lesser curvature which marks the opening of the cardiac orifice into the stomach. At the pyloric end of the stomach you will see that the pylorus is very markedly open and that a large amount of bismuth in the five-minute picture has already passed into the duodenum. The most noticeable and spectacular point in regard to the whole picture however is the very large filling defect which is noted in the region of the greater curvature. You will see that there is a distance of approximately $4\frac{1}{2}$ inches in length along the greater curvature in which no bismuth appears running in. From what ought to be the normal line of the greater curvature of the stomach there is a filling defect extending to a depth of approximately $2\frac{1}{2}$ to $2\frac{3}{4}$ inches. In the center of this filling defect you will notice there is apparently a crater of bismuth which communicates with the cavity of the stomach. This bismuth crater is very irregular in outlines and suggests that the bismuth has made its way into the ragged fissure-like cavity extending into the center of the tumor mass (Fig. 365).

Such a huge filling defect of course can be due to but one thing. There must be a very large comparatively soft carcinoma situated in the region of the greater curvature which has ulcerated in its interior and which is pouring a certain amount of blood into the stomach constantly. Into the cavity of the tumor mass the bismuth has made its way and shows in the x ray plate

as from the x ray
car
atol
om. This patient has been treated for something over a year

in which carcinomata of the stomach have been found for the first time after the patient's death being unsuspected in life

The practical points which are to be derived from the demonstration of this patient's case are first that carcinomata of the greater curvature may run a perfectly latent painless course even when they attain enormous size. Second that carcinoma of the stomach can suggest the diagnosis of pernicious anemia but when a careful examination is made of the blood findings in such a case it will be found that the case is really one of secondary anemia. It will also be found in such instances that there are no cord changes. Cord changes almost invariably accompany severe cases of pernicious anemia but are never associated with cases of secondary anemia. The complete absence of any cord changes in this man's case raises the presumption of a secondary anemia. Third the necessity of fluoroscopic and x ray examination as a matter of routine is apparent. Had an x ray examination not been made in this case the diagnosis of gastric carcinoma could only have been suspected. It would never have been made. The absence of pain vomiting and tumor masses notwithstanding the apparent large size of the carcinoma would have suggested that nothing pathologic would be found in the stomach and yet when the fluoroscopic examination was made it was immediately apparent to everybody present that there was a severe disease of the stomach.

We are extremely indebted to Dr. J. B. ...

anemia you do not have a marked emaciation and in this man's case there is a great deal of emaciation one is immediately confronted by the possibility of malignant disease. Such malignant disease might be of course in the genito urinary tract or in the alimentary tract but inasmuch as he has had no symptomatology on the part of the bladder one would not think of looking for a vesicle polyp or a tumor in this man's case. We would rather turn at once as we did to a consideration of the stomach and intestines trying there to find the bleeding point. The x ray picture explains one thing very nicely. It explains why this patient has gone along so well with so much pathology. If his carcinoma were situated in any other location than the one which it occupies he would have had a great deal of symptomatology but inasmuch as it lies in the region of the greater curvature where it has in nowise interfered with the passage of the stomach contents through the pylorus into the duodenum it of course has occasioned no disturbance. He does not have pain because he has no hypermotility. His stomach seems under the fluoroscope to be merely an inert functionless funnel. If there were motion in his stomach he doubtless would have a good deal of pain but since there is no motion whatever he is without pain. Interesting in this connection is the fact that he clearly has an ulcerated carcinoma and yet he has no pain. Evidently carcinomata of the fundus when they are in the stomach are like carcinomata elsewhere they are painless. You know for example that it is not the rule in carcinomata of the breast for the patient to complain of any pain. The same is true of carcinoma of the uterus. The patient may have quite a large uterine carcinoma and be unaware of its presence because of the complete absence of pain. In fact carcinomata in general are insidious in origin and do not betray their presence by anything but the size of the tumor masses which they give rise to. In the case of this patient the carcinoma has but followed the usual law of painlessness. Contrary to the old text book idea gastric carcinomata are by no means always painful. Many of them run a perfectly latent course up to three weeks before the death of the patient. In not a few instances postmortem examinations have occurred

CLINIC OF DR EMMET A PRINTY

LABORATORY OF SURGICAL TECHNIC

DEMONSTRATION OF A PERFECTED TECHNIC FOR POSTERIOR GASTRO ENTEROSTOMY AND FOR CHOLECYSTOTOMY

Summary Desirability of standardization of surgical measures posterior gastro enterostomy skin incision and arrangement of towels ideal location and direction of stoma management of opening through transverse mesocolon incision into stomach and jejunum—control of hemorrhage and details of the introduction of sutures excision of mucosa as an aid in preventing subsequent closure of stoma a new needle forceps

Cholecystotomy Fundus of gall bladder brought out of wound—protection of field of operation advantages of spreading trocar wound with scissors over direct incision in gall bladder removal of gall bladder contents drainage-tube—its introduction and suture made safe and easy by threading over solid glass tube closure of abdominal wound—the preliminary mattress tens on sutures

June 19, 1918

I BELIEVE there is a definite need for the standardization of the more common surgical procedures and that a technic which fulfils at all times and in any case the various requirements such as hemostasis asepsis avoidance of unnecessary trauma and the shortening of the time of operation should be perfected and whenever possible adhered to I have used a fixed routine for some time in performing gastro enterostomy and another for cholecystotomy and have found each to fulfil all requirements

For gastro-enterostomy we make the usual incision just to the right of the midline and after cutting through the skin we change our knife and complete the incision Then we apply towels in order to keep the abdominal contents from coming in contact with the skin We place them from this side over to the opposite side and grasp the edge of the skin and the

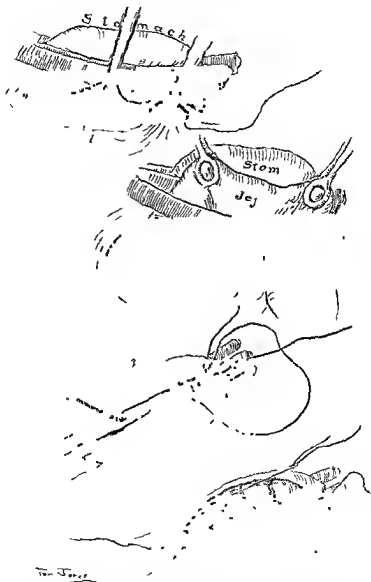


Fig 366—1 Sewing posterior edge of jejunum in mesocolon to posterior wall of stomach, behind the clamp 2 Bringing jejunum into clamp Distal portion of loop corresponds to tip of clamp 3 Cushing suture and method of using May needle for same 4 Vessels exposed and ligated

towel with towel forceps. When we turn the towel back the towel forceps are out of our way. We do the same on the opposite side. As we put in our retractors the stomach comes into view.

The next thing to determine is the position of the proposed gastro-enterostomy opening. This varies with the contour and condition of the stomach. As a rule if we draw a line directly downward from the right side of the esophageal orifice that line crosses the greater curvature at its lowest point and it is there that we must make our opening—as close to the greater curvature as possible and at its most dependent portion. Having chosen the position for the anastomosis we lift up the omentum. That brings up the transverse colon. We pull that up a little more and expose the transverse mesocolon. As we pass our hand to the left and backward we strike a point of fixation and bring up the first loop of jejunum. Pressing on the anterior wall of the stomach we push its posterior wall against the transverse mesocolon. Puncture of the transverse mesocolon now exposes the posterior wall of the stomach. We once more identify the lowest point of the greater curvature and hold it up with Allis forceps. We are going to make the direction of our opening downward from right to left (Mayo). In some cases this direction of opening is impracticable either on account of the position or condition of the stomach or on account of the variance in the point of exit of the beginning of the jejunum. This forceps to the left locating one end of the proposed stoma is at the greater curvature and the one to the right is $1\frac{1}{2}$ inches away from the greater curvature. We put our clamps on the stomach portion and bring up sufficient stomach to work with. At this stage we sew the posterior portion of the opening in the transverse mesocolon to the stomach with a few sutures (Fig 366 1). This edge is to be drawn up close. We make a half-circle well back of the clamp. If our mesocolon is very thick we can invert the cut edge just as we would put in a Lembert in the intestine. This opening must be closed in order to prevent a postoperative hernia of the intestine through it. We close the remainder of that opening later.

outer coats down to the submucosa. As we cut down to the submucosa the mucosa commences to bulge out and we can see running across this incision numerous large blood vessels. Before finishing the incision into the stomach and severing these vessels we ligate them which is considerably more of a conservative procedure than letting the suturing control hemorrhage from them especially as the suture might miss the large ones. Now in ligating these we ligate first on the side nearest the greater curvature keeping close to the cut edge for the reason already given. We pass directly beneath the vessels with our suture and securely tie them off (Fig 366 4). If the vessel is large we also ligate the opposite extremity as the collateral circulation of the stomach is so great that we can have severe retrograde bleeding. Now we feel a little more secure as to the occurrence of postoperative hemorrhage. Then we do the same thing on the jejunal side. We are now ready to complete our opening into the stomach and jejunum. In making our opening into the stomach we place the Allis forceps at each corner grasping the mucosa and lifting it up. Then with a scissors we snip across one corner making a small opening into the lumen. Then introducing one blade of the scissors into the lumen we cut around it (Fig 367 5). While doing this we are careful not to destroy our ligatures. Now we have excised the mucosa. This safeguards against subsequent and premature closing of our new stoma. Now having carefully sponged the stomach and intestine being careful not to scrape or traumatize the mucosa we are ready for our inner row of sutures which are especially for hemostasis. We place the Allis forceps on the two inner flaps below to hold those parts up for us. We sometimes paint between the inner flaps with a little iodine. We begin our suture on the outside passing directly into the lumen at one corner a fair distance from the cut edge. Then we pass through both of our posterior edges and then come out on the opposite side making somewhat of a U (Fig 367 6). When we tie that we have almost a purse string. We also find by having our knot on the outside that we are better able to tell when completing the suture whether

The first loop of the jejunum is now brought up. This loop usually passes from the fixed point directly to the left toward the left kidney. That means we must make our opening in the stomach from right to left. If we find that the ligament of Treitz binds down this loop we cut it between ligatures. We always endeavor in making this anastomosis to make the opening more on the anterior side of the intestine so that when we turn our intestine back there will be no kink at the jejunal flexure. We pick up the jejunum with rubber-covered forceps. In putting on our clamp we keep as close to this flexure as possible and stretch the intestine before clamping (Fig 366 2).

Now we must wall off our field. We first put moist sponges at each side of the clamp. Then we put a towel on each side. We use a special towel called a lap towel. We put it around the clamp in that way (indicating). Then to each side of that we put another sponge and a towel over the handle of the clamp. Before starting to suture I want you to note these directions. The greater curvature of the stomach is passing upward toward the heart. In starting the suture we take the first stitch across the line of approximation between stomach and jejunum being careful not to puncture the lumen and being careful to catch the submucous coat. We place forceps on that suture end. Now we use the Cushing type of suture sewing parallel to the long axis of the intestine. We find that this type of suture quickly buries itself and makes a neat suture line with no linen exposed. We use a Mayo needle forceps in our left hand to push away the intestine then to make counterpressure against our needle and then to pull our needle through (Fig 366 3). We make this first suture line from $2\frac{1}{2}$ to 3 inches long depending on the size of the opening we want as it must be longer than the opening we are to make. As we put in our last stitch before pulling it tight we pull on the loop to see that our suture line is as tight as we want it then we lock and pull directly backward.

We then make our opening starting first on the stomach side beginning about $\frac{1}{4}$ inch from the suture line and the same distance downward from the knot cutting only through the

posterior edges. We lock this occasionally to prevent the suture from slipping and it also has the added hemostatic value of the locked suture. You can see that this whip stitch has a tendency to roll over the mucous edges and leaves this with a much smoother appearance than we get with the old type of Connell suture. Now we loosen the clamps to see if the posterior edges are going to bleed. If there is any bleeding point we will put a mattress suture through and tie off the vessel.

Now we whip around this corner until we have practically started back on the anterior edges of our incision and then we change to the Connell suture by coming outside and then crossing to the other side. From here on we use the Connell suture and this suture is put in in the same direction as the Cushing suture was applied except whereas the Cushing suture is not a through and through suture the Connell is. It goes directly in and then out for the purpose of hemostasis and rolling in the cut edges. We put this in in a slightly different fashion from the usual way dividing the stitch into two parts one with the needle passing through into the lumen and the other out. It is put in as follows. The left hand is holding the suture taut. The needle is now thrust into the lumen and while pulling this portion of the suture through the loop is engaged by the second finger of the left hand while the thumb and index finger of the same hand grasp the suture a few inches from the needle (Fig 367 7). This gives us the effect of tissue forceps for holding up the cut edge and steadying it for the subsequent outthrust of the needle. The suture is now pulled entirely through and again held taut by the left hand. This enables us to put in a very accurate and rapid Connell suture. It avoids the necessity of steadying the cut edge with forceps thereby avoiding traumatization and scraping of the cut edges which tends to produce more bleeding and possibly is a factor in subsequent ulceration. As we come toward the end of this suture you can see how the anterior edge is turned out for us by this loop. We now lift up on the original end of the thread so as to bring the knot which marks the beginning of the suture line into view.

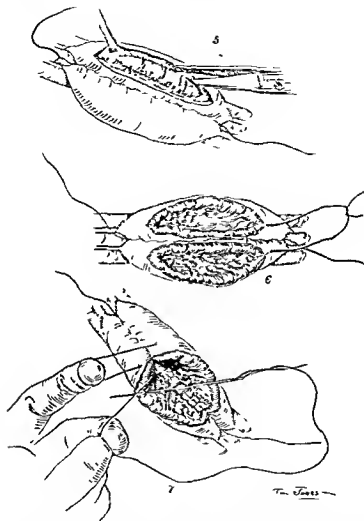


Fig 367—5 Elliptic excise of mucosa 6 Author's "R" stitch at beginning of inner row of sutures 7 Author's method of holding loops while introducing Connell suture

we have actually gotten completely around and turned in all the cut edges. Now we enter the lumen and whip up the

posterior edges We lock this occasionally to prevent the suture from slipping and it also has the added hemostatic value of the locked suture You can see that this whip stitch has a tendency to roll over the mucous edges and leaves this with a much smoother appearance than we get with the old type of Connell suture Now we loosen the clamps to see if the posterior edges are going to bleed If there is any bleeding point we will put a mattress suture through and tie off the vessel

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We know when we reach that point that we have turned in all the cut edge. We then tie and cut off the ends.

We next clean our field by removing all soiled sponges and towels and loosen the clamps to avoid a too prolonged pressure. Then we change our gloves as we have found it difficult to remove all dry blood and stomach or intestinal contents by merely washing. Our work from now on is clean work and our hands should be clean for that purpose. On returning to the table we inspect our suture line to see that all edges are turned in and that there is no bleeding. After washing off the field we sometimes paint the suture line with iodin before reinforcing with our last suture. Now we pick up the first suture (which

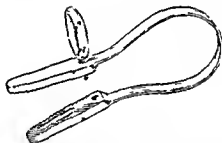


Fig. 368.—Author's needle forceps for use with straight or curved needles.

was folded in the towel) and come back with the same Cushing suture that we first started. When sewing with straight needles I occasionally make use of my new type of needle forceps (Fig. 368) which I have found very handy for use with a straight needle (Fig. 369 1). It gives a better purchase on the needle and avoids trauma to the gloves. We also use it for a curved skin needle in closing up our abdominal wound (Fig. 369 2). An added advantage of this forceps is that in tying our sutures we do not need to lay the needle forceps aside (Fig. 369 3). We can also use it like a thumb. Now we place an interrupted suture at each corner to take the tension off our suture line and to approximate more jejunum to the stomach as a preventive of a sharp angulation. Then we inspect our last suture line

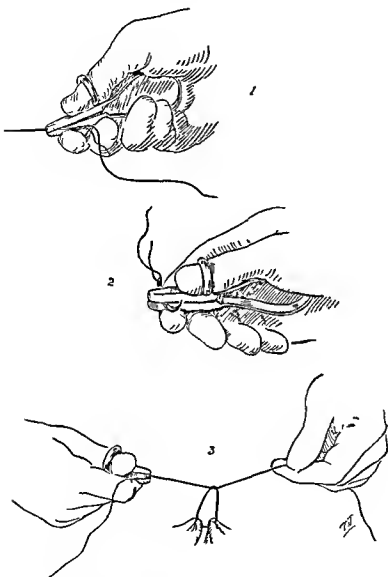


Fig 309—1 Position of straight needle in special forceps 2. Method of holding curved needle 3 Method of tying

for bleeding. We already have a very slight blood-clot along the suture line which is a great help in sealing our new opening. We inspect the posterior row of sutures and make sure that the posterior portion of the opening in the transverse mesocolon has been closed. We find it convenient to close the anterior portion of the opening now with interrupted sutures. Having made sure of our closure of the transverse mesocolon we then restore the structures to their position within the abdomen.

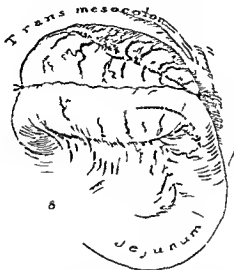


Fig. 370—The completed anastomosis. Direction of opening and relation to greater curvature.

From the anterior surface of the stomach we can see no evidence of our work but we can feel close to the greater curvature a good-sized opening which easily admits the tips of three fingers. It is not a slit but a punched-out oval opening. Lifting up the omentum we can see that the jejunum has been restored to its original position and that there is no kinking or pulling at the junction and no loop between the fixed point and our anastomosis (Fig. 370).

CHOLECYSTOTOMY

In working upon the gall bladder for the purpose of drainage we endeavor if the gall bladder is of the long type to bring the fundus above the level of the abdominal wound surrounding it with sponges and fastening these on either side with forceps catching a little of the peritoneal covering of the gall bladder at the same time. We find that this completely shuts off the peritoneal cavity. After placing Allis forceps on each side of the fundus we steady the fundus while we plunge in our trocar and aspirate the contents (Fig 371 1). Now instead of enlarging this opening by cutting with a knife or scissors we merely insert a scissors or forceps into the small opening made by the trocar and stretch the opening to the size we want it. We have much less bleeding from such a procedure and we find the opening conforms itself better to the tube which we expect to introduce. Now we grasp the edges with our clamps. Holding these up to prevent the escape of bladder contents we take a narrow piece of gauze and introduce it into the depth of the gall bladder thereby sponging out all the remaining contents. Sometimes we bring out small gall stones. Now we take a large spoon and remove the stones. If we find them especially hard to dislodge we can place one finger outside of the gall bladder and with a scoop inside we can dislodge the stones which have become impacted in the wall. After having brought out all the contained material we place a finger cot on the index finger and introduce the finger into the gall bladder. That is the best way of ascertaining the condition of the gall bladder mucosa. We feel down against the cystic duct and we feel against the liver. We can determine more of the condition of the mucosa in this way than we can with a spoon. Then we withdraw our finger and remove the finger cot.

Having determined that this gall bladder may be left behind we introduce a drainage tube. We use a specially prepared tube the special preparation consisting in introducing a metal or a glass rod which is slightly smaller than the diameter of the tube itself (Fig 372). We find that this is a great help with the flexible tube. We find the tube easier to-

for bleeding. We already have a very slight blood-clot along the suture line which is a great help in sealing our new opening. We inspect the posterior row of sutures and make sure that the posterior portion of the opening in the transverse mesocolon has been closed. We find it convenient to close the anterior portion of the opening now with interrupted sutures. Having made sure of our closure of the transverse mesocolon we then restore the structures to their position within the abdomen.

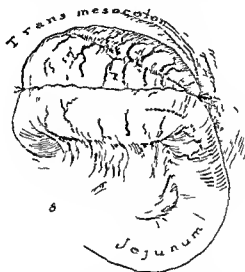


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and easier to hold in position, it facilitates the introduction of sutures, and it also helps when inverting the cut edges with the purse-string suture. This idea was originated by Dr. Boyd S. Gardner, formerly of this laboratory. During the four or five years that we have used it we have become more and more aware of its numerous advantages. Now we introduce three interrupted sutures of plain catgut to anchor the tube to the gall bladder. We introduce the tube a distance of $\frac{1}{2}$ to 1 inch. We put our anchoring stitches into the gall bladder serosa just as we would put a Lembert in the intestine and then introduce the needle into the tube and the glass rod turns the needle directly out (Fig. 371, 2). Introducing our stitch in that way



Fig. 372—Rubber drainage tube rendered non flexible by insertion of solid glass rod

gives us a primary inversion of the cut edge. I sometimes make use of my new purse string which gives a little more accurate approximation (Fig. 371, 2a). We use for this a straight needle threaded with plain catgut. Starting $\frac{1}{4}$ inch away from the cut edge we put in three stitches, then we come up and take a stitch in the tube and then come back and take three more in the gall bladder. After every three stitches into the gall bladder we come up and take a separate stitch in the tube. We find this stitch gives us the same turning in with a more accurate

Fig. 371—1 Aspirating contents of gall bladder with Ochsner trocar. 2 Fixation of tube to gall bladder and inversion of cut edges. 2a Another's purse-string for fixation and inversion. 3 Ready to invert second purse string. 4 Inversion completed.

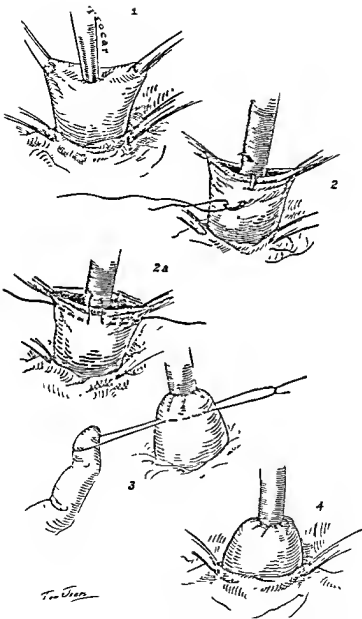


Fig 371

the other two and find we have accomplished two things First, we have taken off the tension and second we have everted the edges Now the edges being well everted we can use an ordinary running suture to close up the peritoneum without the



Fig 373 ~Closure of peritoneum Mattress sutures carried through peritoneum and posterior rectus sheath evert the edge and greatly facilitate closure

necessity of putting in our sutures in such a way as to produce an ectropion The mattress sutures also aid in keeping back the viscera as we are sewing up the opening and they reinforce our continuous suture

approximation of the gall bladder to the tube. We now have our tube anchored to the gall bladder and we have a primary inversion of the cut edges and a fairly good approximation. Now we put in a second purse string of chromic gut or if we have used interrupted stitches to connect the gall bladder to the tube this would be our first purse string. If the assistant picks up little folds of the gall bladder wall we can introduce our purse string with great ease. All the time we are working the rubber tube is closed by the glass rod so that no gall bladder contents are leaking into the field of operation. When we reach the point opposite the starting place we pull through our needle so as to leave a loop of thread. Now the assistant pulls up the loop of our suture and holds up the tube while we are preparing to tie (Fig 371 3). This rod reinforces the rubber tube and we find it very easy to invert the rubber tube and tie our purse string whereas in the case of a flexible tube we often find the tube bending. Now in tying this suture we find another advantage from the fact that no matter how tightly we tie we can not constrict our rubber tube. Leaving the rod still in the tube we return the gall bladder to its normal position (Fig 371 4). We do not anchor it to the peritoneum but close the wound around it in the usual way. We make sure that the tube does not emerge from the wound at a point too close to the rib or liver margin as in that case the liver edge with each inspiration will be pushed against the fixed gall bladder. We do not bring our tube too far down in the wound as that might cause a kinking at the junction of the cystic duct and gall bladder. This rod can be removed immediately or left in until the patient is returned to bed and the tube with bottle arrangement is about to be attached.

In closing the peritoneum I sometimes make use of an original method which is a great help when the peritoneum is friable and tears easily. We grasp the cut edges of the peritoneum and posterior rectus sheath with *forceps* and put in a mattress suture. We place three mattress sutures through the peritoneal edges one near each extremity of the wound and one near the center (Fig 373). We tie the center one first and then

CLINIC OF DR EDWARD L MOORHEAD

MERCY HOSPITAL

EXSTROPHY OF THE BLADDER—3 CASES—SURGICAL RESEARCH REPORTS

Summary Incidence pathologic anatomy and diagnosis of exstrophy of bladder
Treatment—skin plastics unsatisfactory technic and results of the Maydl
operation A case of exstrophy of the bladder in a patient who has borne
children

Surgical Research Ascending renal infection a result of faulty technic. Iso-
lated intestinal loops—the detoxicating effect of the liver Simultaneous trans-
plantation of common duct and posterior pancreatic duct in dogs Pancreatic
diabetes

ONE of the more unusual and at the same time unfortunate surgical conditions which we are called upon to relieve is exstrophy of the bladder This condition is a congenital defect the diagnosis of which is to be made by inspection It occurs once in about 29 000 births Five males to one female are so afflicted That the male generative organs are more complex, that deficiencies in the anterior median line occur most frequently in the male, and that deficiencies in the posterior median line occur with more frequency in the female sex, probably account for this difference The appearance is characteristic at the first glance In the pubic region where the symphysis should be there is a round red vascular projection of mucous membrane which becomes more prominent when the child cries or strains On the front of this are the ureteral orifices, with drops of urine falling from them at regular intervals, above is the linea alba generally very much widened, so that the two recti are far apart, below is the flattened penis, with the urethral groove on its surface, and the openings of the prostatic follicles, and on each side is a rounded projection caused by the pubic bones, which do not meet in the middle line

urine will drain. Trendelenburg advocated the division of the sacro iliac synchondrosis from behind and the gradual approximation of the pubic bones by properly contrived splints until the sides of the cleft are sufficiently close to be united. The operation is performed during infancy.

Since Maydl in 1892 first successfully transplanted the vesical trigon into the sigmoid colon in a case of exstrophy of the bladder this method—in some instances modified—has been followed in 152 cases collected from the literature and the 2 cases which we show you today.

Of the total number 129 were males (five of adult age) 25 were females (7 of adult age) 44 patients died—a mortality of 28.5 per cent. Deaths were attributed to pyelonephritis 21 general peritonitis 8 chloroform narcosis 1 pneumonia 3 hemorrhage 1 pulmonary embolism 2 other causes 8. The functional results in 3 who recovered were good.

The longest period of observation of patients was seven years. The originator of the technic reported 10 cases—an unusually large number. 12 cases were contributed by seven American surgeons.

We are fortunate to be able to show you 2 cases today, one of which we operated according to a modified Maydl and the other one was operated several times by plastic methods. By this you can see the futility of the old method of attempts to form an anterior bladder wall by plastic operation.

Before showing these cases I will give you the history of another male case.

CASE I—H. L. man age twenty years whose family history was negative had had no illness since childhood and always lived on a farm doing the usual work. The disagreeable odor caused by decomposing urine prevented his attending school. He could neither read nor write. The extreme sensitiveness of the exposed bladder mucosa did not tolerate the wearing of trousers and a dark colored loose fitting skirt reaching to just above the ankles was worn instead. His gait was waddling. A catheterized specimen of urine contained nothing pathologic. Surgical treatment of this patient during his earlier years

The testicles may be in the scrotum or in the inguinal canals and there may be a hernia as well on one or both sides. The thighs are widely separated from each other, so that the gait is waddling, and if the skeleton is examined the obturator foramina are found to be smaller than normal, the iliac bones straighter, and the pubic bones separated by an interval of from 2 to 4 inches.

In the female the appearances are so much the same that sometimes there is a little difficulty in determining the sex. The testes, however, or the body of the uterus, as the case may be, can usually be made out without much difficulty.

In older cases the skin becomes excoriated, the surface of the projection becomes rough and granular from the constant friction and irritation to which it is subjected, papillary growths spring up around the ureteral orifices, so as to cause a slight degree of obstruction, leading to dilatation of the ureter and later involvement of the pelvis and secreting substance of the kidney.

An extrophied bladder may become carcinomatous. A few cases have been reported. The mortality during infancy is 60 per cent.

This congenital defect is best explained on a mechanical basis—an intra uterine rupture of a completely formed bladder. The first stage in the process is the closing up of the urethra causing retention of urine. The pubic bones at this time scarcely cartilaginous, and still ununited, are kept apart until they become hardened. At the same time the rectus muscles are kept apart, so that little by little, by the intravesical pressure of urine, the bladder presses against the abdominal wall and finally ruptures and forms adhesions to the borders of the split.

In the treatment of this condition many attempts have been made to reflect flaps of skin to cover in the opening and form an anterior wall for the bladder, of these, the most successful is Woods, but even with this, the greatest benefit that can be hoped for is the formation of a cavity which will retain urine for a short time with the aid of an appliance into which the

A modified Maydl operation was performed in two stages. The abdomen was opened through the left rectus muscle, the sigmoid was delivered, the bowel was divided, both ends were closed and a lateral anastomosis was made with needle and thread between the proximal and distal segments at the lowest point possible. The plan was to use the pouch above the anastomotic opening—in the distal segment placed medially—as a receptacle for urine. Recovery was uneventful. Ten days later catheters were placed in the ureters. An incision was made following the line between the skin and bladder mucosa, a catgut ligature was applied 2 cm distal to the interureteric line, the mucosa and muscularis proximal to this was divided and the tissue grasped with forceps, the bladder flap was dissected sufficiently loose to transplant without tension; there was considerable venous bleeding which was controlled by hot sponges and a few ligatures. The vesical flap containing the trigon was trimmed to the proper size and wrapped in gauze.

The peritoneal cavity was opened in the midline, the sigmoid colon was brought up, a curved intestinal clamp was applied to the pouch, the trigonal flap (requiring a quarter turn) was apposed to the bowel. The intestine was opened longitudinally 3.5 cm. transplantation was made with a loop-on-mucosa suture followed by Lembert stitches. The cavity resulting from the dissection of the bladder flap was packed loosely with plain gauze. The laparotomy wound—endeavoring to correct diastasis of muscles—was closed.

The patient returned to bed in fair condition, on the second day he was much better. He voided urine by rectum every four hours. He did not vomit or complain of renal tenderness. In short the postoperative course was satisfactory until the seventh day when a sudden change was noticed. He complained of precordial pain; his facial expression was anxious; breathing difficult; pulse rapid and weak; temperature elevated. His condition became steadily worse and he died within a few hours.

A limited postmortem revealed a circumscribed peritonitis in the region of the transplantation. There was no leak. The trigonal

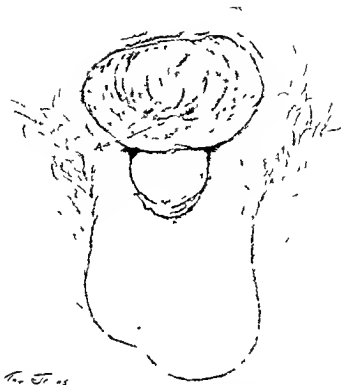


Fig 374—Male. Exstrophy of the bladder. Below the umbilical scar the recti muscles are widely separated; a fibrous layer between them covers in the abdominal cavity. In the pubic region, separated from the normal skin by a white line, a rounded mass 4.5 by 6 cm. is seen; its color varies from pale rose to dark red; the surface is irregular or wrinkled; granular in patches. The parts are covered with slime and constantly wet with odorous urine. The ureters are seen opening on the surface of this mass between mucous folds. The orifices discharge jets of urine at intervals. Symphyseal pubis is absent; a fibrous band 1.25 by 6 cm. connects the pubic bones. There is complete epispadias; a shallow groove indicates the floor of the urethra; the roof is wanting. Testicles, scrotum and anus are normal. There is no hernia. The prostate gland is palpable.

several times proposed to the parents was rejected for various reasons. A suicidal tendency of late prompted the desire to seek relief now (Fig 374).

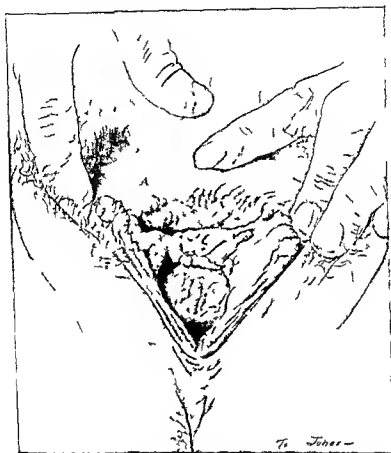


Fig. 375.—Female. Exstrophy of the bladder. Distension of rectum lies above the vagina; seen the exstrophed bladder 4 by 6 cm. with ureteral openings discharging urine intermittently; this trickles in sufficient quantity to keep the parts below always wet. No symphysis pubis; the pubic bones are joined by a fibrous band; cleavage of clitoris and labia minora; hypertrophy of the latter. The labia majora are sparsely covered with hair. The cervix (eroded, enlarged and lacerated) protrudes beyond the vulvar orifice. The result of injury to pelvic floor is apparent. No palpable disease of adnexa.

vomited several times. Gastric lavage was performed. The patient left the hospital in five weeks, pleased with her condition.

flap and the bowel wall were of good color the ureters were normal the kidneys were somewhat congested there was no pus Venous thrombosis was apparent in the region examined

Considering the trauma to the large veins encountered in the dissection of the exstrophied bladder and the clinical course pulmonary embolism was probably the immediate cause of death.

CASE II—We are pleased to be able to show you this patient for her case is unique—the first instance according to the literature in which the patient was a mother

Mrs R. was twenty-six years of age at the time of operation now three and a half years past. She is the only member of her family to have a congenital defect. The greater part of her life has been spent in the rural districts. She has never attended school and is unable to read or write. Prior to her marriage she worked as a domestic. To obtain employment was difficult and her stay in one place was usually brief. She has borne two children one is living age four years the other died when four months old. While her condition was pitiable before she became a mother childbearing followed by prolapse of the uterus and vagina added much to her woe (Fig 375)

At the first operation the cervix was amputated and the pelvic floor repaired. Recovery was satisfactory

At the second operation (three weeks later) catheters were inserted into the ureters. The exstrophied bladder was dissected subperitoneally to the required extent and wrapped in gauze. The peritoneal cavity was opened. The uterus was amputated at the corporocervical junction. The ovaries and tubes were preserved. The ligaments were used in the best possible manner to anchor the stump. The sigmoid colon was delivered and an intestinal clamp applied. The bowel was incised in the long axis 3.5 cm. The bladder was brought in apposition with the colon no tension. Anastomosis and closure of the wound were similar to that previously described. The anal sphincter was dilated and a rectal tube inserted. Following this operation there was a moderate degree of shock from which the patient soon recovered. She voided urine by rectum every three or four hours. On the eighth day she

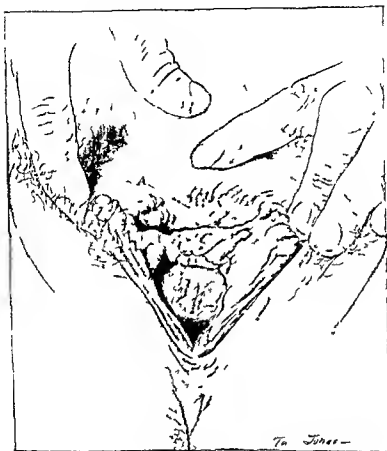


Fig. 375—Female Evstrophy of the bladder D astasis of recti muscles.

trades beyond the vulvar edge The result of injury to pelvic floor is apparent
No palpable disease of adn va

vomited several times Gastric lavage was performed The
patient left the hospital in five weeks pleased with her condition

Urine was now retained four hours during the day, and caused little discomfort at night. It is now three and a half years since she was operated on. She is able to attend to her household duties and complains of no discomfort. General health is good. Surely the result in this case is quite satisfactory.

CASE III—By way of comparison with the modified Mavdl operation this young man has kindly consented to allow me to present him in order to show the result of attempts to form an anterior bladder wall by plastic operation.

Mr G P age forty years. He differs from the two preceding cases in that he is quite intelligent having received a grammar-school education. For this he is deserving of much credit as we can all realize the torments and difficulties through which he passed during his school days. He has told me his story of the discomforts and trials he suffered and yet nothing was done to alleviate his suffering until he was twenty-four years of age. At that time he placed himself under the care of a surgeon and for one year remained in the hospital during which time he underwent seven operations with the result which you can plainly see. What has been accomplished? Practically nothing except that there is a small pouch (which holds a few drams of urine) with an opening at the lower angle from which the urine flows continually. He wears a urinal at all times and is very much inconvenienced. He desires that we do something for him but with this immense amount of scar tissue it is questionable if operation would be advisable.

The great objection raised to the Mavdl and other operations in which a portion of the intestinal tract is utilized for the urinary receptacle has been that a ceciding infection would occur. During the past six years in a number of dogs after removing the major portion of the urinary bladder we have transplanted the vesical trigon into the colon. Our early attempts were occasionally followed by fatal peritonitis or pyelonephritis. Latterly the results have been quite satisfactory and we believe by proper technique this objection can be overcome.

The result desired in the surgical treatment of exstrophy of the bladder—a reservoir for urine under control—is best attained by the method of Maydl or a modification of this procedure

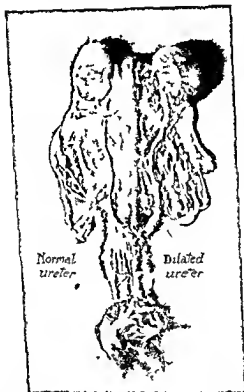


Fig. 376.—Pathologic specimen from dog. Ascending infection in a dog terminating fatally in ten days. The left ureter is dilated and the left kidney contains pus. No changes on the right side.

My associate Dr. J. J. Moorhead will demonstrate some of our research work.

In the bladder work we believe that ascending infections are due principally to faulty technique. This picture of a specimen of kidneys, ureters and transplant removed ten days following

operation in which an intentional error of technic was committed shows how the ascending infection occurred on that side and not on the other (Fig. 376).

I will show you several dogs with a brief description of the operative work done in each case.

Dog No. 1—Female On February 5, 1916, the major portion of the urinary bladder was removed, the urethra divided between ligatures and the vesical trigon implanted by suture into the colon. Urine is now voided per rectum. No ill effect has been noted.

This is one of a number of dogs used in our experimental work on ascending renal infection—with a similar result.

Dog No. 2—Male Nine months ago the jejunum was divided about 8 cm. from the duodenojejunal flexure and again sectioned 15 cm. lower; continuity of intestinal canal restored by end-to-end suture; isolated loop (mesentery intact) washed with 2 liters of sterile water and the ends closed by inverting stitches; the serosa of the loop abraded and the excluded segment of intestine attached to the inferior surface of the spleen by a few mattress suture.

A considerable quantity of fluid distends the abdomen—a common result in animals surviving this experiment; otherwise the dog's condition is quite satisfactory.

Dog No. 3—Male September 4, 1911. Practically the same technic except that the closed washed loop of intestine was attached to the inferior surface of the liver. No demonstrable amount of fluid in the peritoneal cavity. This dog has manifested no sign of illness.

In articles published recently co-workers and I showed that a closed isolated loop of the jejunum washed with sterile water and ether was compatible with life—about 6 per cent. of the animals operated upon lived indefinitely.

In these dogs (Nos. 2 and 3) the isolated closed loop—washed with water only—instead of being dropped into the peritoneal cavity was attached to the inferior surface of the liver or the spleen, with the expectation that the detoxicating function of these viscera would be called into action. What is known con-

cerning the liver especially encouraged this hope. The connection between the bowel and the liver or the spleen should lessen the danger of perforative peritonitis. A complete report of this original work will appear later.

Dog No 4—Female. Ten days ago the common bile duct and the lower or posterior pancreatic duct (the dog has two ducts) were excised from the duodenum and transplanted into the jejunum. I believe this is the first instance in which these two ducts have been transplanted successfully at one time. Four or five weeks from the date of this primary procedure the duodenum will be extirpated.

That this part of the intestinal tract is essential to life has been long believed and taught. That an animal may survive complete duodenectomy following a diversion of the biliary and pancreatic secretions into the jejunum has been the basis of considerable experimentation. The results thus far leave much to be desired.

Dog No 5—The entire pancreas was removed from this animal three weeks ago. The urine at present contains about 5 per cent sugar. The dog eats a good supply of food and drinks an abundance of water but is extremely emaciated. Pancreatic diabetes—of which this is a demonstration—proves fatal within four or five weeks.



CLINIC OF DR CHARLES MORGAN McKENNA

ST JOSEPH'S HOSPITAL

A CLINIC ON GENITO-URINARY SURGERY

Summary Case I—Papilloma of the bladder—treatment by excision through suprapubic route and radium

Case II—Kidney stone—diagnosis Operation—correct position on the table the muscle-splitting incision through Petit's triangle—the use of fat to prevent postoperative hemorrhage

Case III—Ureteral stone—diagnosis—removal through the bladder via suprapubic incision—method of draining bladder—the right angled glass tube

Case IV—Acute epididymitis—palliative versus operative treatment. Technic of drainage of epididymis—importance of relieving tension on tunica vaginalis and tissues of scrotum

BEFORE beginning our operative work this morning I would like to show you a case operated on in this clinic four months ago The patient, who was referred to me by Dr L A Beaton gave the following history

CASE I—PAPILLOMA OF BLADDER

Mr W, fifty two years of age Father died at the age of eighty one, mother seventy seven living and well, one brother forty five years of age

He had the diseases of childhood Married twenty eight years Has three children living and well

He never complained of any illness until six months ago, at which time he noticed a few drops of blood in his urine, and a few days later a little more blood was noticed on finishing urination He consulted a physician who gave him some medicine About two weeks later he had a considerable hemorrhage from the bladder, at which time he was referred to a physician who gave him fulguration treatment three times over a period of two and a half months A week ago he had some hemorrhage

The patient was put to sleep with gas-ether anesthetic. On opening the bladder a large papilloma could be easily recognized on the left side of the bladder, involving the left ureteral opening. The diameter of the upper surface was about $1\frac{1}{2}$ inches. The pedicle was about $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter. The evidence of the fulguration could be seen about the base and a little toward the upper surface. It was evident that the tumor could not be removed without injuring the ureter on this side.

An incision was made directly over the ureter on that side of the bladder, about $1\frac{1}{2}$ inches away from the base of the tumor. The bladder was carefully dissected and the tumor mass removed. The ureter was incised about $\frac{1}{2}$ inch away from its orifice. Chromicized catgut was introduced into the distal end of the ureter, which was used for transplantation later on in the operation. The transplantation was easily made in the upper angle of the bladder incision. The bladder was closed in the ordinary way and a fairly stiff rubber tube, $\frac{1}{2}$ inch in diameter, connected with a right angled glass tube, was used for drainage. The tube was placed at the upper angle of the skin incision.

The wound healed with primary union up to the tube. The drainage was removed on the fifth day when radium was introduced by means of a lighted cystoscope. It was easy to introduce the radium into the deepest part of the incision by this means. The radium was allowed to remain in the bladder seventeen and one-half hours, when it was removed by the nurse.

I would like to mention here that it is impossible to do good bladder and kidney surgery without having a well trained and experienced nurse. By an 'experienced nurse' I mean one who is familiar with the handling of this class of cases. When the nurse is not especially interested in the outcome of the case the patient never does well. I cannot say too much about the after-care of bladder cases. They need special care, and the first four or five days usually determines the outcome of the patient. This is very noticeably true in prostatic work. These patients, you know, are all old people. They have had considerable shock from the operation and a wet bad-smelling

dressing over the abdomen is very objectionable to the patient and if he is in a ward complaints from other patients often arise I have made it a practice for some time to have the same nurse and whatever else you do *take care of the after dressings yourself* No one is more interested in the outcome of the case than the operator and to get good results it is most necessary that the operator or at least a very closely associated assistant look after these cases once or twice a day

You can see from observation that this man is very well nourished He complains of no trouble on urination and has no blood in his urine He has gained 21 pounds in weight 2 pounds more than he has ever weighed in his life He is not troubled in getting up at night and suffers no pain We will cystoscope him now and see the condition of the bladder

You notice that the patient tolerates about the normal amount of fluid in the bladder without discomfort The right side is perfectly normal The left side where the dissection was made is perfectly healed but somewhat red The urine can be seen coming from the left ureter On the whole I think the bladder looks exceedingly well

CASE II—KIDNEY STONE

The first case we will operate this morning is a large silent stone in the left kidney This patient was referred to me by Dr L A Beaton I will ask the intern to read the history

History—W E twenty two years of age Mother living and well Father died six months ago from apoplexy Two sisters and one brother living and well One sister was operated on two years ago for stone in the right kidney

The patient says that he passed a stone through the urethra about four years ago and has not had much pain since One week ago he had a sharp pain in the region of the left kidney which radiated toward the left leg and down the left groin and leg He passed a few drops of blood He has had no pain since that time

DR McKENNA Three days ago a cystoscopic examination was made and the bladder looked normal The ureteral orifice

also appeared normal. A shadowgraph catheter was introduced and an x ray picture made. A large silent stone can be seen in the picture. The stone fills the entire pelvis of the kidney and has some projections down into the ureter. The calices of the kidney are fairly well outlined and may contain part of the stone although Dr. Trostler the x ray man is inclined to believe that the kidney is filled with a number of

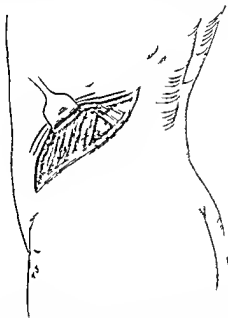


Fig. 37.—Oblique lumbar incision exposing Petit's triangle and muscle borders, the separation of which characterizes the approach to the kidney used in this case.

small stones. We will bear that in mind until the kidney is opened.

In bringing in this case you will observe that the patient is in perfect position to have the operation made. He is on the right side with specially made shoulder braces to keep that part of the body in position. The center of the table is well elevated so that the left side on which we are to work is well

in view. I think it necessary to have these details worked out because it saves so much time in the turning and handling of the patient after he is asleep. The table is so constructed that these straps hold the legs in position so that it is a much better table to work on than a flat one requiring a number of sand bags to hold the patient in position.

The incision is made parallel to and midway between the last rib and the rim of the pelvis. We have exposed the muscles so far without using an artery clamp (Fig 377). I am going to divide Petit's triangle. By doing this there is but little hemorrhage and you will see the ease with which the kidney can be palpated. We will have to elongate the triangle in both directions. We are now down to the perirenal fat. This is always split completely so as to make delivery easy. I preserve the fat as it can be used to considerable advantage later on in the operation. With a piece of dry gauze I can readily separate the fat of the upper pole from the kidney (Fig 378) but the lower pole seems to have quite a number of adhesions. These will gradually come off I believe by just taking a little time and making a slow dissection (Fig 379). It pays to spend some time when adhesions are present because the kidney can be delivered so much easier afterward. On putting my hand in the cortex of the kidney the stone can be easily felt. It seems to fill the entire pelvis and parenchyma. I think it is the largest stone I have ever felt in a kidney. Great care must be exercised in delivering the kidney or else the stone will break through the parenchyma thereby destroying the kidney substance and leaving small particles of the stone in the kidney which will only serve as a nucleus for other stones. By cutting down on the stone through the parenchyma we will have space enough to enucleate the projections of the stone out of the calices. You notice we have exposed the body of the stone with the edges still intact which can be easily removed through this incision. Each calix is filled and a projection of the stone about $\frac{1}{2}$ inch in length is in the ureter. We will have the specimen measured and weighed (Fig 380).

In closing the kidney we will make use of the fatty capsule



Fig. 378.



Fig. 379

Figs. 378 and 379—Separation of fatty capsule and delivery of kidney

A layer of fat is placed in the incision of the kidney. A suture is put through the kidney wall and also the fat. I might mention here that neither the patient nor his family would consent to having the kidney removed. Since the upper pole is in good condition the kidney is allowed to remain. The one thing that we must consider is postoperative hemorrhage. Fat inserted as it is here serves as a natural packing and will prevent hemorrhage. It is not uncommon to have this class of cases suffer from severe hemorrhage after the operation. This may occur at any time from the day of operation to three or four weeks



Fig 380—Specimen removed it filled entire renal pelvis with projections into calices

after. I had one experience of a severe hemorrhage three and a half weeks after operation. The patient had gone home apparently recovered from the operation when taken with this terrific hemorrhage. She was immediately brought to the hospital and the kidney removed. In that case no fat had been used to arrest hemorrhage and the infection around the stone present at the time of operation had continued until enough necrosis had taken place to produce the hemorrhage.

In this case today three sutures are all that are necessary to close the kidney. The fatty capsule is brought up over the



Fig. 378



Fig. 379

Figs. 378 and 379—Separation of fatty capsule and delivery of kidney

Mother still living Two brothers living and well One sister alive Five children in family dead

Past History—Had bladder trouble since a child Urinations very frequent with continuous pain on left side This pain is dragging in character intermittent and recurs about once or twice a month Some pain experienced on urination Had an operation two years ago for papilloma of the bladder Had another operation one year ago for growth in the bladder Still continues to have pain on the left side and has had no relief from the operations

Present Complaint—Two weeks ago the pain started in the left groin radiating through to the left kidney The pain is dull and aching in character continuous increasing in severity on coughing and upon urination There was some burning pain in the urethra during urination The patient must get up five to six times nightly and urinates often during the day

Urinalysis shows blood and pus Skiagraph shows a light shadow about $1\frac{3}{4}$ inches above the bladder We have had a number of pictures made and the same shadow is produced

On cystoscopy the right ureter is normal but the left ureteral orifice and bladder wall are much pouched into the bladder Scar tissue can be easily recognized on this side The corresponding side is very much reddened and inflamed On catheterization the right kidney shows normal urine while on the left side the catheter can only be introduced about $\frac{3}{4}$ inch and a wax tipped bougie shows an indentation on the catheter tip

Functional test was not done on this case as the diagnosis is complete without it

Operation We will go about this case in the same way as we do in a suprapubic prostatectomy The bladder as you notice is well filled with water for distention This brings the bladder well up in the perivesical space and will make it much more easy to expose the bladder and push the peritoneum up We will now make a median incision and expose the bladder through Retzius space You will note that we spend some time pushing the peritoneum back from the bladder wall and

kidney and a cigarette drain placed down to the parenchyma. We will now close the muscle—three or four sutures are plenty for this purpose (Fig. 381). I remember a few years ago twenty or thirty sutures were used for closing, but at that time the muscle-cutting operation was used. I cannot place too much emphasis on the advantage of the muscle-splitting incision which we now use. It makes the work so simple and the patient feels perfectly comfortable afterward. The patient will not favor

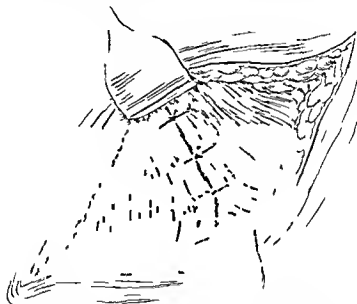


FIG. 381.—Closure of muscle-splitting incision. No small number of sutures required.

this side and at the time he leaves the hospital will walk naturally. The drain will be removed in twenty-four hours and after that no other dressings are necessary.

CASE III.—URETERAL STONE.—*Referred by Dr. W. BURMEISTER*

I will have the history of this case read.

History.—Mr. J. R., forty-two years of age, admitted to hospital seven days ago. Father died of softening of the brain.

large stone I have no trouble in getting the forceps on the stone, but it is so enclosed in the cavity that it is difficult to remove it without destroying the bladder wall I can bring it to the edge of the orifice. Now give me a long forceps so that I may get a better grip You notice that with this forceps the stone does not slip away from our grasp This stone is at least $1\frac{1}{2}$ inches long and $\frac{3}{4}$ inch in diameter (Fig 382) It is conical

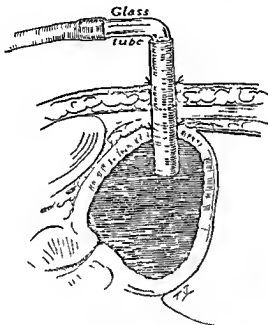


Fig 383 —Method of draining bladder by right angled glass tube

at both ends I would like to have the doctors observe the continuous flow of pus which follows the removal of this stone It will be interesting to see how this man's kidney functionates afterward. We will follow this case closely and report its progress from time to time By means of repeated functional tests we will compare this left kidney with the right

I will now place two sutures in the bladder wall and introduce a rubber drain into the uteteral orifice and drain through

we also spend some time cleaning the fat off the bladder wall before opening. This is done so that a better cleavage can be obtained on the margin of the bladder when suturing the bladder together again. It also does away with necrosis of fat tissue and sloughing in the repair.

The bladder wall is now opened with a fine bistoury and a dry lap sponge is placed over the opening while the assistant releases the catheter which is still in the bladder through the urethra. This allows the water from the bladder to flow off into a basin and keeps the abdomen perfectly dry and the field clean. The bladder opening is made a little longer so as to expose the trigon. I now illuminate the bladder with an electric



Fig. 387.—Lateral stone removed through the bladder

light. This electric lamp has been sterilized and can be used to good advantage in the bladder cavity. The left ureteral orifice is very much dilated and pus is jetting from it in about the same way urine does. This shows that the kidney is functioning on that side. We can see the scar of the previous operation in the bladder wall. I now introduce a curved probe into the ureter to see if there is a stone present. You notice how the pus flows out after the probe has been introduced. There seems to be a large abscess in the ureter. I can easily feel the stone with the probe. We will enlarge the ureteral orifice and try and remove the stone with a curved forceps made for that purpose. The stone seems to be conical in shape. It seems like a very

sleep very readily as you see under gas and the operation will be continued with an ether anesthetic. As I make the incision through the different layers it sounds a great deal as though I were cutting leather under tension. This tension has been causing most of his pain. We are now down to the tunica vaginalis. It is markedly hyperemic. We will make the incision in the tunica just the same as though we were doing a hydrocele. There is about an ounce of fluid around the testicle. Now we will expose the globus minor. The epididymis is very much swollen. By taking this straight sharp bistoury and making a small incision in the globus minor a few drops of pus can be expressed (Fig 384 1). Yes I would say there are about 5 or 6 drops in this case. We will now introduce a small gutta percha drain in the lower pole (Fig 384 2) and the operation will be finished in the same way that a hydrocele operation is done and will do away with any fear of a hydrocele returning to this patient (Fig 384 3).

A point that I would like to make clear to you gentlemen is this that the incision for acute epididymitis is always made on the side of the scrotum opposite to the epididymis. This is done because of the great amount of pressure from the fluid around the testicle and the great tension of the various layers of fascia between the tunica vaginalis and the skin. I tried some years ago making a small incision into the epididymis and inserting a drain. The result was very successful as far as removal of the pus was concerned but the patient was not entirely relieved of the pain. We find that the patient suffers as much pain if not more from the tension of the various layers of fascia with fluid in the tunica than he does from the epididymitis itself. This of course is due to the infection coming directly from the epididymis through the rete testis proper into the testicle thus producing an orchitis. I mention this particularly because in this case the patient will be entirely relieved of pain on awakening and will have no more suffering. The drain will be removed within twenty four hours and the patient discharged on the second day.

I believe if this operation were carried out more frequently

the perivesical space. You notice in suturing the bladder that we run a double row of sutures from the lower margin of our incision up to the top. This is done to make the bladder wall water tight. We will suture each layer up to the skin very closely so there will be no remaining spaces. In this way primary union is easily obtained and the patient has no more discomfort from the drain than he would in any other abdominal case. We now introduce a glass tube bent at a right angle into the rubber tube in the bladder, carrying the tube well down underneath the skin (Fig 383). Much harm is often done when the glass tube is not carried far enough below the skin because the glass inside the rubber will bend the rubber upon itself and cut off the flow into the jar outside. In this way the drainage from the bladder is forced through the stitches and a general infection takes place which keeps the patient in the hospital much longer under the most disagreeable conditions and retards union for some weeks. We therefore spend much time in seeing that perfect drainage is established which not only helps the patient but also does away with much attention in the after treatment.

CASE IV.—ACUTE EPIDIDYMITIS

This man has been suffering with an acute epididymitis for the past three days. The doctor in attendance has used all the palliative means without success and the young man is complaining of excruciating pain. In an article written some time ago I said that all acute epididymites were divided into two classes—severe and non severe. The non severe will yield to palliative treatment such as the different kinds of salts elevation etc., while in the severe cases surgical procedure is always necessary. You notice that this man's scrotum is very much swollen and red and the testicle is very tender on pressure. I would like to say before operating on this case that we will find that this man has not only an inflammation of the epididymis but also a beginning hydrocele.

The patient will now be put to sleep and an anterior incision made in the right side of the scrotum. The patient goes to

that we would have fewer cases of sterility You know where suppuration is allowed to go on from day to day the patient not only suffers severe pain but an occlusion or blocking takes place in the globus minor thus producing permanent sterility I have had occasion to do a number of short circuitings of the vas deferens with the epididymis in order to produce fertility This has been done with some degree of success but it is difficult at times to find a field in the epididymis where you get free living spermatozoa

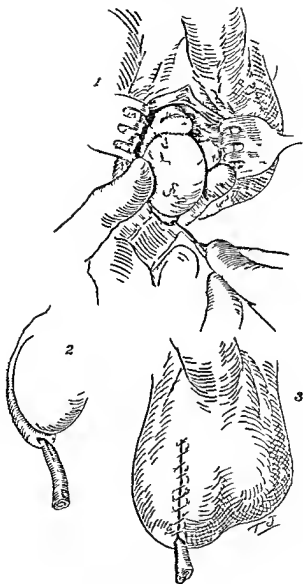


Fig 384.—1 Exposure of testicle and incision in globus minor of epididymus
2. Gutta-percha drain in place 3 The operation is completed.

CLINIC OF DR THOMAS J WATKINS

ST LUKE'S HOSPITAL

PRESENTATION OF PATIENTS TREATED BY RADIUM FOR HEMORRHAGES DUE TO BENIGN CAUSES

Summary Radium a specific cure for hemorrhage at the menopause with certain exceptions it is not suitable for treatment of fibroids—necessity of further experience

July 19, 1918

I WILL present brief reports of cases and then make comments on the use of radium for hemorrhage from the uterus due to benign causes

Mrs B aged forty nine, has been bleeding for the last year each month for ten or twelve days Otherwise well Examination shows uterus retroflexed, about twice as large as normal, with a small fibroid in the left horn

On March 20, 1917, 50 mg of radium were inserted into the uterine cavity and left for twenty four hours Very little constitutional disturbance resulted from its use For the following two months she had scant menstruations, none since

Examination now shows uterus senile in size and no tumor palpable, no menstrual discharge for fourteen months A cure has resulted The radium apparently saved her from hysterectomy

Mrs W C B, aged forty four at time of examination, had been flowing profusely for one year Hemorrhage at times lasted from thirty to forty days She was otherwise well except that she was anemic

Examination showed a uterus about one and a half times normal size Diagnosis was menopause hemorrhage due to disturbances of the ductless glands

November 9, 1916, treated with 50 mg of radium for twenty-four hours Very little constitutional disturbance resulted

Miss L. E. M., aged forty, uterine fibroid size of a three months' pregnancy Hemorrhages

Treatment, 50 mg of radium for twenty four hours on December 31, 1917 There has been one scant menstruation since The uterus is about normal size There is very little disturbance except for hot flashes There are one or two small fibroids, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, to be felt in the anterior wall of the uterus

Mrs N., aged forty one, hemorrhage at menopause This patient had received three series of x ray treatments for hemorrhages, with little or no relief

May 11, 1917, treated by 50 mg of radium for twenty four hours She has had no bleeding since and is cured

COMMENTS

These cases which are selected at random, indicate that radium is a specific treatment for hemorrhage at the menopause One can, with almost complete certainty, expect a cure with one treatment With proper screening there is no danger from 1200 mg hours of radium in the uterine cavity In our experience the chief constitutional disturbance is nausea and vomiting, and this is often considerable following the radium insertion It almost invariably disappears upon removal of the radium

The screening generally used is 1 mm of brass covered by thick rubber We have used platinum and gold, but find no advantage in their use, except the screen need not be quite as thick and consequently, does not require as much dilatation for insertion A gas anesthesia is generally necessary for dilatation and exploratory curetage

The dangers from infection should be considered about negative We, however, had one instance where the patient after returning home developed a — — — which resulted in to a latent infec

In cases of fibroid radium is well adapted to the treatment of small fibroids in women near the menopause In younger women it is better to remove the tumor than to destroy the

One moderate menstruation on the following month and none since. The patient is cured.

Mrs. B. C., aged thirty-seven, had a right oophorectomy and double salpingectomy three years ago. Curetage for hemorrhage November 19, 1917. Some improvement followed curetment.

Examination showed uterus normal in size and position with a large cystocele and rectocele.

January 4, 1918, exploratory curetage and "advancement operation" for cystocele and perineorrhaphy. Insertion of 50 mg. of radium for twenty-four hours. There was considerable bleeding for two months following the use of the radium. Since then she has had amenorrhea. Diagnosis was metritis resulting from an old infection. Without radium she would have required a hysterectomy.

Mrs. F. C., aged forty-two, was curetted one year ago for hemorrhages. Has had excessive menstruations for four years.

Examination showed a slightly enlarged uterus otherwise negative. Diagnosis, hemorrhage of the menopause.

February 19, 1917, radium treatment—50 mg. for twenty-three hours. Had one menstruation the following month which lasted for two or three days. Since then there has been no flow and the uterus has become senile in size.

Mrs. A. D., aged thirty-eight, first seen April 29, 1918. Two years previously had a myomectomy. Since operation has bled almost continuously at times profusely. Has become very anemic.

Uterus is very slightly enlarged and probably contains some small fibroids but none are palpable.

April 29, 1918, treated by 50 mg. of radium for twenty-four hours. There was a large amount of bleeding which was fairly constant for two months following the treatment. Since then there has been no bleeding and she seems to be cured. Although the radium has probably made it unnecessary to do a hysterectomy, the amount of disturbance and inconvenience resulting from the hemorrhage suggests that a hysterectomy would have been preferable to the use of radium in her case.

CLINIC OF DR. CHARLES B. REED

WESLEY MEMORIAL HOSPITAL

AN OBSTETRIC CLINIC PRESENTATION OF 2 CASES

Summary Argument for the induction of labor at term—the common objections not well founded—methods of estimating size and weight of the unborn child—the Voorhees bag—technic of its use—its superiority to the catheter and the pack—the place of pituitrin—its dosage and uses—a case for cesarean section—the indications—the technic—advantages of delivering the uterus before incising it

June 10, 1918

THE first case to which I want to call your attention is rather unorthodox and, consequently, is entitled to more discussion than usual.

The induction of labor at term is comparatively new, and the question that at once comes up in your minds is, Why should we induce labor at term? The reasons for inducing labor at term are four, and any one of them in my opinion, is a sufficient warrant for the operation. The first reason is that the child is mature at term while the onset of labor is always accidental. Now it is no more justifiable to leave the child to fall by accident than it is to leave ripe apples on the tree instead of plucking them. We do not leave an apple to the chance of impairment or to the injury that occurs when accidentally dislodged; neither should we abandon the child to a similar fate.

Second the child should not be allowed to become post mature. Why not? Because the child puts on fat in the uterus just as an adult puts on fat after he reaches maturity. Fat is a degenerative change. Fat is a sign of greater intake than the system has demand for. The child puts on weight at the rate of $\frac{3}{4}$ pound a week after maturity. It grows only at the rate of $\frac{3}{4}$ cm. a week during the same period of time. This

function of the ovaries by radium. In large tumors the dangers of a mistaken diagnosis, of malignancy, and of intraperitoneal complications make them poor cases for radium. Radium is also not well adapted for submucous or subperitoneal fibroids. The amount of bleeding which results occasionally from fibroids after the use of radium is a decided objection to it. The amount of bleeding is sometimes so much as to disturb the patient more than does the usual hysterectomy.

It is necessary to have further experience with the use of radium in fibroids before definite statements can be made relative to its indications in the treatment of fibroids.

morning to night. She passes through a safe delivery at the close of the day and he has not been interrupted by other calls. The woman has had his care and attention all day. All these things—the patient, nurse, hospital and doctor—are benefited as you can readily conceive from your experience by knowing exactly when labor will begin and ordinarily within a variable period of about two hours we can say when the labor will end so that any one of these reasons is in my opinion a justifiable indication for the induction of labor at term.

Now in your own minds you have been quietly raising objections and there are objections. The objection that we hear most frequently and the objection that comes to us from the laity and from medical men alike is that the process is contrary to nature. It is contrary to nature because nature is careless and indifferent. Irrigation is contrary to nature but it is more felicitous than rain. Is not the opening of an appendiceal abscess also contrary to nature? The abscess will open in time if left alone. True but it may open into the peritoneal cavity into the colon or into the rectum but why leave it to do so? The progressive doctor will open that abscess at once and avoid all the accidents that come when nature takes charge of the case. That same man who is careful in the matter of the appendiceal abscess often refuses to accept the doctrine of induction of labor at term. He evades his responsibility.

Another objection has been raised which to us was very important and caused us much anxiety and that is the danger of infection which of course comes into the minds of all of us. The danger of infection was at first the most vital menace that we felt. What are the chances of infection? If I preface my remarks by saying that we have had no infections that we have had no temperature of more than 100° F. in some thing like 250 cases wherein we have induced labor except where it could be accounted for by breast conditions or other glandular involvement and of these only a few then you will understand that this has become more or less of a stationary issue with us. Infection we believe is theoretic rather than real as an objection. Why? Because the woman's labor is so short that her

means that the child will probably put on 3 or 4 pounds before the accidental onset of labor. What is the result? It means that an unusually large child is driven by unnecessarily severe pains through a poorly dilated passage and one that is extremely hard to dilate. It means that the child will perish in many cases as a consequence of the severity of labor. It means that the mother will sometimes perish, that she often will be badly mutilated, and that she will in all cases be exhausted and her convalescence will be lengthened by the protracted character of her labor. Therefore we do not and should not allow the child to become overmature.

Third, it shortens the duration of the labor. We have demonstrated clearly in our work at Wesley that the average duration of all induced labors, whether *primiparæ* or *multiparæ*, is seven and a half hours. This is a gain of from six to ten hours in the duration of labor, a very vital point when we consider the danger to the child in long labors and the dangers of maternal exhaustion. The first stage is shortened from four to six hours, the second stage from a few minutes to several hours, depending upon the case.

Fourth, it is a matter of convenience. Now that seems irrational. Why should we induce labor as a matter of convenience? Because, as Adam Wright of Toronto said in defense of induction of labor, "If it is less harmful to interrupt labor than to allow labor to go on, then we are certainly justified in seeing that labor is begun." To the woman who is working and who is compelled to give up her work at an uncertain time and go to the hospital, it is a matter of economic importance. To the woman who is not working and who must engage her nurse at a certain date, it is a matter of importance to know when the nurse should be engaged. To the hospital, it is a matter of expense to know whether a woman will remain in the house for six hours, six days, or six weeks. To the doctor, it is a matter of prime importance to know that on a certain day his case will deliver, to know that on a day appointed and in the morning his patient will go into labor, and to arrange so that he has nothing else to do on that occasion but take care of her from

biparietal diameter We take with the calipers the occipito-frontal measurement of the head and by a series of deductions which we have carefully worked out varying from $1\frac{1}{2}$ to $2\frac{1}{2}$ cm, we come within $\frac{1}{4}$ cm of the biparietal diameter Now when we realize that the biparietal diameter can come through the pelvic brim when it is at least one-half and sometimes a full centimeter larger than our calculated measurements then we can be sure that we have measured approximately enough the size of the fetal head All of this has a bearing on the maturity of the child We do not induce labor on premature babies We know that mature babies weigh between 6 and 8 pounds and therefore we can assume that of all babies that are born weighing more than $8\frac{1}{2}$ pounds 71 per cent are post mature as Winckel has shown 71 per cent have gone over time 71 per cent have clung to the mother until overfat until fatty degeneration has set in It is a sign of postmaturity and beginning degeneration that should not be awaited

We have found then as objections (1) contrary to nature (2) danger of infection (3) danger of a premature child and now (4) the possible dislocation of the presenting fetal parts This objection is more theoretic than real In our experience we have not been able intentionally or otherwise to bring about a change in the presenting part by the ordinary use of the bag The head seems to follow the same rules when the bag goes down as those which determine its position in the first place It follows the bag down in exactly the same way in which it enters the pelvis without the bag We have tried on several occasions to convert an occipitoposterior position into an occipito-anterior position when the bag has been in place In only one instance that I know of did one of our prominent obstetricians succeed in changing the position of the head In this case he carried the bag in and produced a face position out of what was a normal occipito-anterior one I have always believed he was trying to insert the bag into the fundus instead of into the cervix because I cannot understand how a bag inserted in the cervix with even moderate skill could bring about such a radical change in the position of the head

resistance is unimpaired. She comes out of labor in an average period of seven and a half hours, and her tissues are in condition to resist all kinds of infectious agents. In our first cases we religiously made smears of the cervix and of the vaginal surfaces in every case and we found streptococci, staphylococci, gonococci, and other germs, and we went ahead just the same though with fear and trembling. We got no temperature because, as we believe, the shortness of labor makes the woman resistant to infectious organisms. If these same women had had protracted labors, whether induced or not, it is highly probable that the puerperium would be complicated by a temperature—at least in some cases.

Another objection was the danger of prematurity. All of us have been taught and believed that while we could measure the pelvic brim to advantage, we could not measure the child. Now we know that we *can* measure the child, and in all cases we *do* measure the child, and in *all* cases we know the exact length of the child, the probable weight, and probable biparietal dimensions. We presume a child born at term to be from 49 to 51 cm. in length, that it weighs approximately 7½ pounds, and that the biparietal diameter is 9½ cm. We can get the measurements which give us these dimensions with the utmost ease and certainty. By Ahlfeld's method we measure from the breech of the child to the upper border of the symphysis, deduct 2 for the thickness of the abdominal wall, and multiply by 2 to allow for the extension of the body. In 100 cases that we have examined the largest error made was 2 cm. Usually we come within ½ cm. of knowing the length of the child which is approximate enough.

Second, we use McDonald's method of measuring the uterus. By putting one end of the tape on the symphysis and the other end at the height of the fundus of the uterus, we are able to get our estimate. We usually get 35 cm. Spiegelberg and Varnier have maintained 33 cm. to be the normal height of the uterus at term, but for our purpose 35 cm. is safer. We have found that the height of the uterus at term will vary from 33 to 35 cm. Then there is Perret's method of estimating the

tween the membranes and the uterus (Figs 385 and 386) In the operations which we have done we find about 3 cases out of 100 where an anesthetic is required That means that the great majority of these cases are affected rather by nervousness than by the pain of introduction

CASE I—Now you see the speculum is introduced as gently as possible The upper edge of the cervix is seized with a

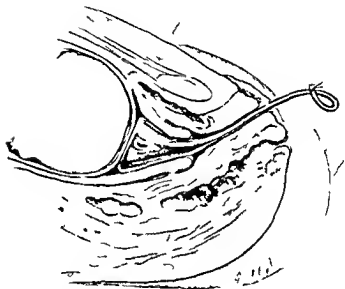


Fig. 386—Vaginal lig. n. place and filed to e. party with lysol solution

double tooth tenaculum and pulled down The finger is introduced to assure us as far as possible of the location of the os Ordinarily the bag goes in with considerable ease but there is resistance on the part of this patient due to nervousness It is an error in technic to rupture the membranes and it would not have occurred in this case were it not for the restlessness of the patient We rupture the membranes in possibly 2 cases out of 100 The Pean forceps are now unlocked and

Now a word as to the technic. We use in nearly all our cases the Voorhees bag No. 4 which is as you see, a flat topped fabric bag. With the old elastic bag of Carl Brown the ease with which the head could be dislocated was considerable. With this bag, which is inelastic and flat topped, it is not possible to dislocate the head. In arranging for the insertion of the bag we pull out the end of the bag and then roll it up like

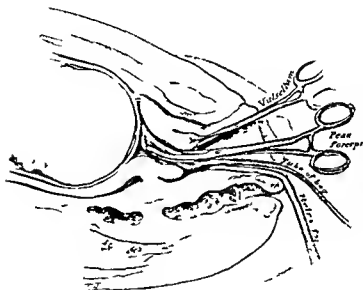


FIG. 353.—Technic of introduction of Voorhees bag

a cigarette as firmly as possible. We have as a consequence a cylinder-shaped structure which has a hard sharp cone-shaped point of resistance in front. Ordinarily such a bag will be carried into the cervix without any great difficulty. The bag is seized with a pair of Peau forceps and is introduced ordinarily without the use of dilatation or chloroform. It is carried readily into the cervix and up—if necessary—beside the head be

rupture of the uterus with pituitrin and we do not believe that a ruptured uterus can follow the use of pituitrin in a normal woman if there is no obstacle to the delivery of the child, if there is no pelvic contraction and if there is no cervical rigidity and if there is opportunity for the child to advance. With this dose we get a much better effect than if using larger doses. We do not get the tetanic contractions of the uterus. In this case today it is the second child and we sometimes have more difficulty than with the first because of uterine inertia.

When we first began the use of pituitrin we used the full ampules of 30 mm. Some men used two or three ampules. With 30 mm. you get a strong almost tetanic contraction of the uterus lasting twenty five minutes. You can conceive the effect of such contraction on the circulation of the child. We believe that with the smaller doses we do not cut off the circulation. We make the injection straight into the deltoid muscle. We frequently get very good results with 2 or 3 minims. Finally, in certain cases we find resistance to the insertion of the bag. It is usually the internal os that furnishes the resistance to the bag rather than the external os. In the case before you we had no trouble with the internal os but we had some trouble finding the external os which was torn and expanded.

QUESTION What is the advantage of the bag over the catheter?

DR REED It is quicker, cleaner and more efficient. I have no objections to the methods that may be used by others such as the catheter or the tamponing of the cervix with iodoform gauze but my experience has demonstrated that the bag is more satisfactory. The bag is a mechanical dilator to the canal, while the catheter is not. It prevents rupture of the membranes until the time comes for the membranes to rupture spontaneously. You will get a dilatation of three or four fingers in three hours and twenty minutes. With the catheter or packing of the cervix we would get an inauguration of labor in from twelve to twenty four hours. Meanwhile with the bag the case has delivered. Furthermore the danger of infec

the bag is slowly filled with lysol solution. It does not make any difference really whether air or water is used. Ordinarily we go up beside the membranes if the bag goes that high. You can tell by the resistance of the bag when it is filled. A very little experience will tell you by the hydrostatic resistance when the bag is filled or you can measure the amount of fluid that you introduce if you prefer. The stem of the bag is next tied as securely as possible and a 2 pound weight is attached to the stem and the patient stays upon her back until the child is delivered. The pains will usually begin within an hour after the insertion of the bag. They come on with regularity but at shorter intervals than in uninduced labors. The average length of dilatation is three hours and twenty minutes. Our shortest case was fifty five minutes and our longest case was thirty hours. The dilatation is as a rule three fingers or 3¹ inches. The head comes down or the bag of waters comes down and completes the dilatation in time varying from one half to one hour. As soon as the bag comes out the head will usually follow the bag down. The membranes will rupture spontaneously. The labor pains become normal in strength and rhythm and more profound in character and the process is exactly the same as if nature had begun it spontaneously. In other words we merely start the pendulum of the clock. We do not do violence to nature. We simply say to nature "Now is the time to begin."

There are one or two points about this practice that would have made it impossible in previous years. One of them is the fact that occasionally the pains cease with the delivery of the bag. That occurred in the hands of Dr. Lynch some years ago and has made him reluctant to undertake another series of bag cases. With the introduction of pituitrin we have overcome that difficulty. With the dilatation of the cervix and when the membranes have ruptured the use of pituitrin will reawaken the pains when they show signs of becoming quiescent and the patient will go on to a happy delivery. We use from 5 to 7 minims as a rule. The effect of pituitrin begins within five minutes and lasts fifty minutes. We have never seen a

apply forceps to deliver the head after the uterus was opened. This, of course is an extravagant pursuit after variety.

We follow the classic method of Sanger. We make a median incision and deliver the uterus. We incise the uterus, deliver the child, deliver the placenta, and sew up the uterus with three rows of sutures, and in this case, at the woman's request, we resect the tubes and sterilize her. We close the abdominal wound according to the usual technique. There is no change in this procedure unless changed conditions require it.

QUESTION: What is the advantage in delivering the uterus?

DR. REED: We think the advantage comes partly in the better disposition of the drainage, which is more likely to go outside than inside. But, in addition, the child is more easily delivered and you can see more readily what you are doing than when you are working down in a hole. We usually inject pituitrin about the time we make the initial incision.

QUESTION: Do you always sterilize the patient?

DR. REED: We usually leave that question to the patient. In many instances I insist that the patient be sterilized. In other cases I advise against it, depending on conditions.

Various devices have been recommended for stopping hemorrhage, but most of them are cumbersome and unnecessary. In earlier days when the operation was much newer we passed rubber tubes around the cervix, but we have found that if the incision is done with ordinary speed the uterus controls its own hemorrhage and we rarely lose any great amount of blood.

The abdominal incision has got to be large enough to deliver the child and in all instances it will not require a much smaller incision than the uterus.

This woman was due on the 11th of June, and we figure the babe to be 52 cm. long and to weigh 8 lbs. +. This makes our case fall almost exactly on our clinic day. However, we do not believe that the induction of labor even two weeks before term, if carefully calculated, is of any particular consequence. We do believe that allowing a woman to go into labor four weeks after term is of serious consequence.

The last cesarean we did was for a carcinoma of the cervix.

tion is greater. The bag mechanically dilates the os and dynamically stimulates the pains.¹

CASE II—The second case is a cesarean section. This woman is thirty-two years of age. She is a primipara. She came to us with the history of having been run over by a wagon when she was twelve years old. The wagon passed across the hips. The pelvic measurements are spines 23 cm., crests 25 cm., and external conjugate 17 cm. plus.

Now with the history of such a case we might well feel that the induction of premature labor or labor at term with a possible pubiotomy might answer all conditions, but we find that the right hip is limited in its action to about 90 degrees and is stiff and adducted so that approach to the vulva is extremely difficult. Delivery might yet take place, however, if we put the woman in the right lateral position and drew out the left leg. But we find on examining her that there is another defect. At the distance of 4 cm. below the symphysis the pubic arch measures 4 cm. from side to side instead of 4.8 cm., which is the average. The result is that the head would be forced so far back that it would be impossible to deliver this child through the natural outlet. We are deprived then of the choice of induction of labor at term. We are deprived of the choice of letting her go to term and deliver with a possible pubiotomy, and we are, therefore, restricted definitely and directly to the cesarean operation.

The technic of this operation is relatively simple. It is far less complicated than normal labor, than it is, in other words, to deliver a crooked object through a crooked passage and do it right. It is easier to cut the Gordian knot than to untie it. Various changes in technic have been suggested by one or the other of our distinguished obstetricians such as the fundal incision, the extraperitoneal incision and many others all of which have been relegated to the scrap heap. We do not find any advantage in these. One of our colleagues went so far as to

¹ In this case the bag was introduced at 2.30 P. M. and the labor terminated spontaneously at 8 P. M.

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CLINIC OF DR CHARLES A PARKER

HOME FOR DESTITUTE CRIPPLED CHILDREN

THE TREATMENT OF NEGLECTED CLUB-FEET

Summary Demonstration of a patient twelve years of age with very severe club-foot requiring removal of the astragalus and resection of a bony wedge from the os calcis and cuboid. Review of several similar cases showing type of operation and results.

May 22, 1918

AMONG the commoner types of congenital deformities there is perhaps none whose correction is more thoroughly appreciated by the patient and his intimates than that of club feet, unless possibly that of harelip. The personal appreciation is likely to be particularly keen if the afflicted individual has reached adolescence or adult life before the correction is made. Although the patient upon whom we are to operate today is but twelve years of age she is large for her years and is already very conscious of her affliction. We know such feet a few years hence would virtually mean social ostracism for her. Some inefficient attempts have already been made to correct them. You will observe however that the condition which affects both feet equally is of an extreme type of equinovarus with a large projecting bursa developed upon the outer and upper side in the cuboid region upon which most of the weight is borne in walking instead of upon the sole which does not lie upon the floor and bears no weight whatever (Fig. 387).

These younger persons can walk without shoes but in older people the pressure is so poorly borne that they can hardly take a step without padded shoes. \times Rays of these feet show defective astragali with other bone changes.

Operation—This condition has long since passed the stage of braces, plaster casts and tenotomies. Nothing will suffice

and a hysterectomy was done about ten weeks later. At that time the wound in the uterus showed wonderful repair and revealed excellently the smallness of the scar which would hardly disturb any subsequent pregnancy. The whole scar was not over $1\frac{1}{2}$ inches long.

I think you see now the greater ease with which this uterus is manipulated outside than if you were working down in the peritoneal cavity. We resect the tubes exactly at the uterine end and sew up the hole in the uterus. We close the abdominal wall in the usual way.

Note—The babe weighed $8\frac{1}{2}$ pounds and was 33 cm. long.

moved from the calcaneocuboid region by means of an osteotome, the peronei tendons being held out of the field. The size of the wedge depends upon the correction necessary. In this child it is about $1\frac{1}{2}$ inches wide at the outer side, or base, and its apex extends nearly to the inner side of the foot. With this removed the correction is easily made except for a slight amount



Fig 388—Sketch showing structures exposed by the incision. Dotted line represents wedge of bones to be resected after removal of the astragalus. A, Astragalus B cuboid C os calcis

of varus remaining (Fig 389). This is overcome by removing a portion of bone from the outer and upper surface of the os calcis. As the correction is good and easily maintained the wound is closed with a few catgut sutures approximating the bone surfaces and the skin closed with black silk. No tourniquet has been used and there are no vessels to be tied. Rais

but extensive bone resection and reconstruction. The essential elements of relief are the complete removal of the astragalus and a wedge shaped resection of the os calcis and cuboid.

A single curved incision extending from above and in front of the outer malleolus downward and forward terminating near the base of the fifth metatarsal bone allows a ready removal of the defective astragalus, and the necessary wedge-shaped re



Fig. 387 — Patient before operation

section of the os calcis and cuboid to correct the outer convex border of the foot (Fig. 388).

The removal of the astragalus is accomplished with semi sharp bone instruments that hug closely the periosteum after the ankle and subastragaloid joints have been opened with the knife. When this bone is removed there is immediately considerable freedom of movement of the foot in this region.

With the tissues well retracted the bony wedge is now re-

It takes considerable practice for older people to inure the sole to the purpose for which it is designed after so many years of non-use but pride is an efficient stimulant and normal shoes are early sought. The corrected foot is always shorter than the normal foot. This is no great disadvantage in buying shoes, as the ends can be filled out with false work or short shoes, made



Fig 390

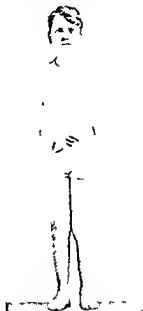


Fig 391

Fig 390 — Twelve-year-old boy recently operated upon. Before operation.

Fig 391 — Boy shown in Fig 390 several weeks after operation.

to order, can be worn. As the feet are so broad compared with their length shoes resembling custom shoes are the ones generally chosen.

Club foot will not relapse after this operation, although, if it is not properly done, the correction will still be incomplete, at whatever stage it is left, and in that much unsatisfactory and disappointing.

ing the lower end of the operating table 6 inches has materially diminished the venous bleeding

The removal of the astragalus relaxes the tendo achillis so much that it usually does not have to be cut and all other tendons are preserved intact

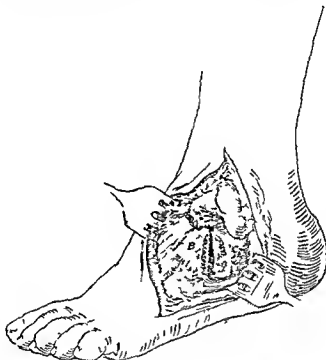


Fig. 389.—Sketch showing relation of parts and corrected foot after the bone operations are completed. *B* Cuboid *C* os calcis

The left foot having been completed the right is treated in a similar manner

After proper dressing a plaster cast is now applied to each foot to maintain the desired correction. This will be changed in two weeks to remove stitches and then reapplied for a period of six to eight weeks, during the latter part of which time the child shall walk in its casts

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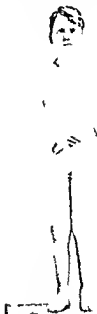


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Fig 390. Eleven-year-old boy recently operated upon. Before operation.
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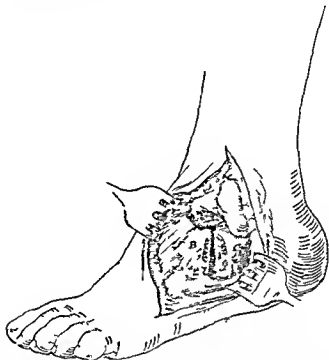


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After proper dressing a plaster cast is now applied to each foot to maintain the desired correction This will be changed in two weeks to remove stitches and then reapplied for a period of six to eight weeks during the latter part of which time the child shall walk in its casts

The photographs I now show you are of adults with extreme types of the deformity like the one operated upon today

Thus one (Fig 392) is of a young man nineteen years old who had his feet so well trained that he could walk with his heels forward so the toes would not interfere. He had had four unsuccessful attempts at correction. This (Fig 393) shows his feet several months later when the final casts were removed.

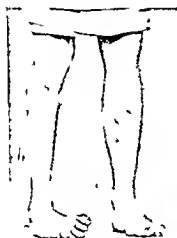


Fig 394



Fig 395

Fig 394 Young man in early twenties before operation. Right foot affected.
Fig 395—Same as Fig 394 after correction.

This (Fig 394) is a photograph showing only the right foot affected in a man in the early twenties. The accompanying photograph (Fig 395) was taken a few months after correction. In each of these cases the operation was similar to the one performed today.

I show you one more photograph (Fig 396) that properly belongs to this series. The feet are those of a man thirty-seven years of age who had never had any attempts at correction.

The feet were corrected as in the other cases and an expo

The ankle joint will not become completely stiff and the movements of the foot will probably be as free as they were before the operation. As to the result we may reasonably expect in this case I show you several photographs of similar cases previously operated upon.

This (Fig. 390) is the photograph of a twelve-year-old boy recently operated upon in whom the deformity consisted prin-



Fig. 392

Fig. 392—Feet of a young man nineteen years old before operation.

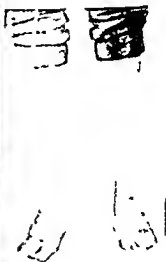


Fig. 393

Fig. 393—Feet of young man shown in Fig. 392 after operation.

cipally of a marked convexity of the outer side of each foot with in toeing the soles being flat on the floor either the result of earlier treatment or a special type of in toeing feet. The

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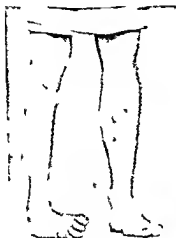


Fig 394

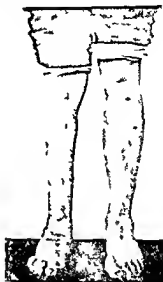


Fig 395

Fig 394 Young man in early twenties before operation. Right foot affected.
Fig 395—Same as Fig 394 after correction.

This (Fig 394) is a photograph showing only the right foot affected in a man in the early twenties. The accompanying photograph (Fig 395) was taken a few months after correction. In each of these cases the operation was similar to the one performed today.

I show you one more photograph (Fig 396) that properly belongs to this series. The feet are those of a man thirty seven years of age who had never had any attempts at correction.

The feet were corrected as in the other cases and an expo

The ankle joint will not become completely stiff and the movements of the foot will probably be as free as they were before the operation. As to the result we may reasonably expect in this case, I show you several photographs of similar cases previously operated upon.

This (Fig. 390) is the photograph of a twelve year-old boy recently operated upon in whom the deformity consisted prin-



Fig. 392

Fig. 392—Feet of a young man nineteen years old before operation

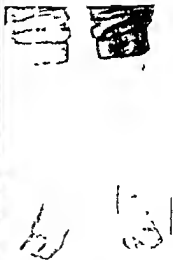


Fig. 393

Fig. 393—Feet of young man shown in Fig. 392 after operation

cipally of a marked convexity of the outer side of each foot with in toeing the soles being flat on the floor either the result of earlier treatment or a special type of in toeing feet. The astragalus was not disturbed in this case a wedge shaped resection of the calcaneus and cuboid well sufficing for the correction as shown in the next photograph (Fig. 391) taken a few weeks later.

CLINIC OF DR MAURICE A BERNSTEIN

WESLEY HOSPITAL

TENO-PERITENDINOUS TRANSPOSITION—AN IMPROVED TECHNIC FOR TENDON TRANSPLANTATION

Summary Two cases of paralysis of certain muscles of leg and foot following infantile paralysis—restoration of function by teno-peritendinous transposition. Rationale of the method—gross and microscopic anatomy of tendons and its bearing on the technic of tendon transplantation.

THE case which I am going to show this morning is that of a boy ten years old who, about six or seven years ago, had a short siege of illness febrile in character and in which no diagnosis was made at that time. The boy apparently recovered, but shortly afterward the mother noticed that the child's right foot dragged somewhat when he walked and there was a distinct lump. The lump became worse and the foot began to turn out. I mention only that part of the history which has a direct bearing upon the present trouble. It is a typical case which comes to the surgeon years after an unnoticed or insignificant short siege of illness. What is the trouble with the boy? What is the trouble with most cases of a similar nature? What is the condition which comes, unnoticed, perhaps with a slight elevation of temperature, general indisposition and vomiting lasting a day or two or a week, and diagnosed as a mild case of gastro intestinal disturbance, and a month or two or three afterward followed by a slight paralysis of one or more muscles in an extremity? It can be only one thing and that is poliomyelitis anterior.

Poliomyelitis anterior has a peculiar selective method of paralysis. I do not mean that only one muscle is affected during the initial onset of the disease. The usual pathologic

sure for a photograph subsequently made but the negative was spoiled during the developing according to the photographer, and the patient had left town for another state before this was known. Requests for photographs brought no results. It was a gratuitous case and perhaps the results did not suit.



Fig. 396.

Fig. 396—Feet of a man thirty-seven years old before operation. The after-operation negative was destroyed by the photographer.

Fig. 397—Same patient as Fig. 396 a little over two months later.



Fig. 397.

We believe our patient today will show more appreciation, and we hope to give her feet that she will at least be willing to have compared with those she had on entering the operating room.

Postscript—The patient operated on in the clinic just reported made an uneventful recovery. The result after two months is shown in Fig. 397.

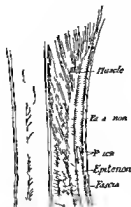


Fig. 398—Cross-section of an extensor tendon. The peritendinous tissue shown in the illustration is made up of the following structural units: Paratenon, an areolar connective tissue which is found at the upper pole of the tendon and has special gliding quality. Plus an epitenon.

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... of the epitenon sending small septa into the tendon separating it into small bundles. (Modified from Mayer)

its relation to the muscle (Figs. 398 and 399). This which you see is the tendon. It is of white elastic fibers. This which you see is its sheath. You will notice that the sheath is loosely

picture is one which involves an entire group or perhaps one or more muscles in several groups. After the acute symptoms have subsided and the destructive process has reached its maximum nature begins its reparative process and a large number of muscles regain their normal or nearly normal integrity. It occurs that one muscle or group of muscles either because of improper treatment following the acute attack or because of the virulence of the infection becomes permanently disabled. Koch quoted by Hufsa says that a fatty degeneration takes place in the muscles affected and that shortly afterward a reconstructive change takes place restoring to normal or nearly normal, those muscles which have been involved.

I shall deal principally with the surgical phase of this subject namely tendon transplantation. This subject has received considerable attention from the clinical standpoint especially at this time when injuries to muscles and nerves are received in overwhelming numbers. I am referring to the war zone and reconstructive surgery. Here is an opportunity to try out this method although one can say that it is no more a trial. We are getting definite results along definite lines.

The indications for tendon transplantation must be definitely established. 1 No tendon transplantation shall be done until the muscles have been placed in the most favorable position for regeneration. This takes as a rule from one to two years during which time reposition massage and electricity must be systematically carried out. 2 No inferior muscle shall be transplanted to perform the work of a strong superior predominating muscle. 3 No muscle shall be transplanted unless it has been proved to be a functioning healthy muscle. 4 A knowledge of the anatomy and physiology and surgical peculiarities of tendons is indispensable for a successful tendon plastic. 5 The importance of asepsis should be emphasized.

I shall give you a working anatomic basis as briefly as space will permit for I feel that in order to understand this work one must familiarize himself with the special anatomy of tendons. Here is a chart taken from Mayer it is a longitudinal cross-section of a tendon with its sheath, its blood-supply, and

mechanism of tendons This which you see is the plica It is a loose connective tissue structure which is attached to the tendon and invaginates forming clefts when the tendon contracts and relaxes This fold is of importance in the limiting of tendon gliding The plica is lined with the same cells which line the sheath The sheath has been compared to a synovial cavity in that it is definitely circumscribed and lined with a layer of cells which can be termed synovial in character and which secretes a synovial like fluid This fluid lubricates the tendon during its phase of contraction and acts like a buffer against traumatism

Here you see the mesotenon You notice that this tissue which is composed of a loose connective tissue structure carries the blood to the tendon (Fig 399) It is much like the mesentery of the intestine You see here how the blood vessels ramify and anastomose in it You see these little red lines? They are blood vessels which ascend from the mesotenon and encircle the tendon and send small off shoots between the tendon bundles You see how important the mesotenon is It is almost as important as the mesentery

Where does the tendon get its blood supply? This inquiry has brought out various opinions by different observers It is now generally believed that the blood supply to the tendon comes from the mesotenon periosteum and from the surrounding connective tissue We are yet to learn the principal source of blood supply to the tendon

Wallenburg was unable to demonstrate either in the newborn or in the adult arteries which started from the muscle belly or from the insertion into the bone or ligaments that ran in a longitudinal direction into the interior of the tendon If the areolar sheath was dissected away no injected vessels were visible

Ancola has shown experimentally that the intactness of the sheath is necessary for perfect nutrition of the contained tendon and on the other hand that complete removal of the sheath is not followed by necrosis of the tendon

The integrity of the relationship between the tendon and

applied around the tendon. It does not encircle the entire tendon like a sleeve does the arm. It covers it much like the visceral peritoneum covers the bowel. This which you see is

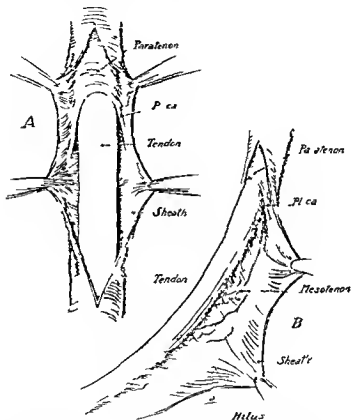


Fig. 390.—Structures that are carried over with the tendon in the transposition operation. *A*, Anterior view. Sheath incised and edges retracted. *B*, Lateral view.

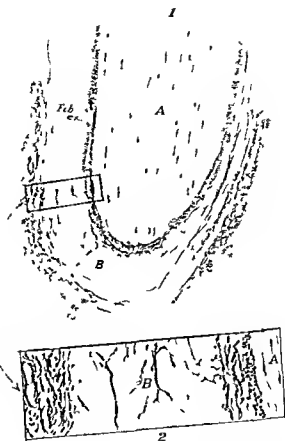
a loose fatty areolar connective tissue. It follows the tendon into the sheath. This tissue is continuous with the perimysium perimurium and the adventitia of the blood vessels; it is called the paratenon. Upon it depends to a great extent the gliding

its sheath therefore must be maintained in the transplantation of tendons since the nutrition of a tissue or organ is of the utmost importance in the maintenance of its vitality and proper function Sturmdorf makes a statement which one should commit to memory The functional integrity of any organ depends essentially on the maintenance of a uniformly normal circulatory equilibrium This applies to any tissue or organ especially to tendons where the blood supply is comparatively poor

We cannot pass this subject without paying a high tribute to Mayer in recognition of the splendid work which he has done along this line I would recommend his book to anyone who is interested in this work The book is full of beautifully colored illustrations and brings the subject up to date

In examining this boy we find a foot which yields readily to manipulation I can extend his foot passively as you see to beyond a right angle But he cannot retain it in that position because he has lost the function of his tibialis anticus which as you know is the most powerful extensor and inverter of the foot This boy has been operated upon before as you see from this scar An attempt was made to anastomose a flexor tendon to the tibialis anticus But the tendon did not hold You see how freely the skin moves above the tendon When he extends his foot this tendon can be seen gliding freely beneath the skin I shall resect this tendon for microscopic examination to note the change which has taken place in it The sheath of this tendon is intact and will be of special interest to us from the anatomic point of view Here is a bursa it is located on the internal malleolus and is due to the rubbing of the brace on the prominent portion of the tibia The condition is exaggerated by the weight of the body being directed through the tibia to the internal malleolus These patients often develop an abrasion on these bursae which does not yield readily to treatment and is very painful because the periosteum is often eroded

I am going to transplant his peroneus longus tendon to do the work of the tibialis anticus I am going to convert this



W. Jones

Fig. 400—Extensor longus tendon transposed through sheath of talis anticus. Low magnification—camera lucida 1 tendon B sheath A. Notice the marked fibrous exudate into the sheath with beginning organization. In the right space long bands extend along the tendon edge B 2 Same as above high magnification. Sheath wall markedly proliferated young blood vessel can be seen in sheath wall and marked leukocytic infiltration is also visible.

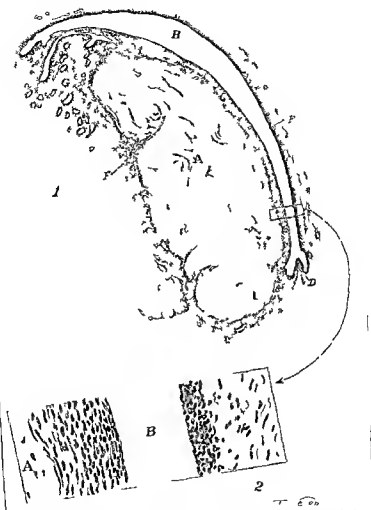


Fig 401. Microscopic section through the tendon and its sheath of a dog twenty-one days after tendon peritendinous transposition. 1 Low magnification—central tendon. A Tendon B sheath C epineurion D pericardium E outer sheath wall F septum C cells in mesoepineurion. Sheath appears clear. Some leukocyte infiltration due to slight skin infection. Note no proliferation exudation nor infiltration of sheath. 2 High magnification of same section B Sheath perfectly clear in spite of marked leukocyte infiltration. The long cigar-shaped cells are proliferated synovial cells from the sheath wall.

abductor muscle into an extensor. I am not going to use the Mayer method, because I desire to maintain the normal relationship of the tendon to its sheath. Mayer builds up a colossal anatomic structure which collapses when he removes the tendon from its sheath. He removes the tendon from its sheath and severs the mesotenon and then transplants the tendon through the sheath of the paralyzed tendon. I am impressed with the fact that the tendon sheath of the paralyzed muscle acts only as a canal guide for a physiologic line of traction. There is no particular anatomic difference between fat, fascia, caryle membrane, or sheath. They are all foreign materials covering the tendon, and react more or less in a uniform manner to the tendon as regards adhesions. All authors emphasize early motion to avoid adhesions. Early motion will avoid adhesions to a certain extent, whether the tendon has been transplanted through anyone of the above named structures. Kauffman says that a tissue will become specialized when called upon to perform a certain definite function. That is to say, that fascia or fat will assume the characteristics of a tendon sheath when tendon is made to play through it for a given period of time. And so we will say that the sheath of another tendon is an abnormal covering for a given tendon just as fascia, fat or caryle membrane, and becomes specialized from continued function.

What happens when a tendon is transplanted subcutaneously into fascia? What happens when a tendon is transplanted through the sheath of another tendon? There is a difference in the microscopic picture of the two. In the first where the tendon is transplanted through fat or fascia injury occurs to the tendon covering that is, the epitenon or, as it is known in its old terminology, the peritendineum externum (see Fig 398). This peritendineum is torn or traumatized in the act of its transference. There is a little difficulty in forcing the tendon down through the newly formed canal, and during its passage the surface of the epitenon is rubbed off. There also follows a traumatic reactive inflammation to the tissues forming the new canal. This is followed by the usual reactive processes, namely,

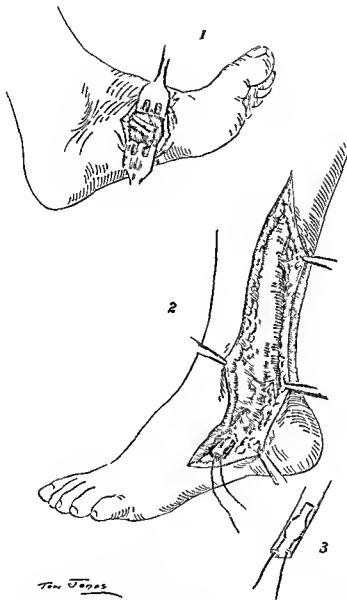


Fig 402 —1 Site over internal cuneiform prepared Tendon of tibialis anticus split for the reception of peroneus longus tendon 2 Fixation suture in place and dissection of peroneus longus tendon begun 3 Retention suture—method of introduction.

exudation coagulation proliferation and organization. The degree of exudation and proliferation of both surfaces varies with the amount of trauma. After the acute process has subsided absorption takes place. There remains however as a result of the above reactive inflammation delicate fibrinous adhesions when these adhesions are permitted to remain organization takes place and fibrous adhesions result fixing the tendon to its new canal. The fixation by adhesions is greatest when they occur at some fixed point as for example bone or ligamentous structure.

The histologic picture which is seen when the tendon is transplanted through the sheath of another tendon is quite different (see Fig. 400). What occurs is this: the rough distal end of the tendon during its course through the sheath rubs the delicate endothelium off from the sheath. Added to this is the invagination of the plica which folds up and forms villous projections. These villi (Fig. 401) if we may be permitted to use that term are covered by the same character of cell as is the sheath and as a result of the pulling of the tendon end these are torn off.

The inflammatory reaction which follows causes an exudate into the sheath (Fig. 401). This consists of blood plasma and cells from the sheath and the epitenon and fills in the space between the tendon and the newly formed sheath. This exudate is soon infiltrated by leukocytes. The process extends into the wall of the sheath causing proliferation of the endothelial cells of the sheath. Thus the endothelial layer of the sheath is thickened and the number of cells is increased. A similar proliferative reaction takes place in the epitenon and extends along the septa that is the peritendineum internum fixing itself to the tendon bundles. It has been demonstrated that if adhesions do take place to the surface of the tendon motion is interfered with. The amount of interference will depend upon the elasticity of these adhesions. By constant gliding of the tendon these adhesions will soon become elongated and often may disappear to an appreciable degree. The pain caused by the operation prevents early motion to a great

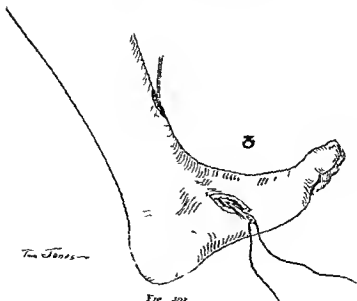
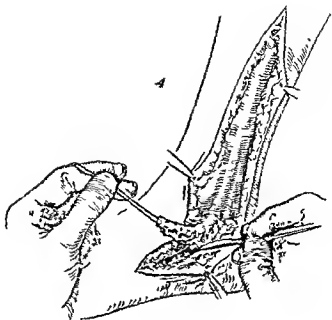
extent, especially is this true in the case of the fingers and hands

The point which I wish to emphasize, therefore, is that the tendon should be transplanted with its sheath in order that the normal relation of the tendon to the above named anatomic structures may be maintained

Operation—The incision for the transplantation of the peroneus longus is rather long, but it must be so in order to expose the entire tendon. The incision is, therefore, made midway between the tibia and fibula and midway between the knee and outer malleolus. Before doing that I am going to prepare the site for the implantation of the tendon, because I want to handle the tendon as little as possible (Fig 402, 1). I make the first incision therefore, over the insertion of the tibialis anticus which, as you know, is the lower and inner surface of the internal cuneiform bone and base of the first metatarsal bone (makes straight incision and exposes tendon of tibialis anticus, splits the tendon, and cuts down on periosteum traumatizing internal cuneiform). We will now make the incision over the peroneus longus (makes incision as above indicated sweeping in curved manner to outer side of external malleolus to beyond peroneal tubercle—Fig 402, 2). We preserve the deep fascia and will transplant it with the tendon. We must be careful not to cut the peroneus brevis. The two muscles are closely associated at the external malleolus and occupy the same sheath for a distance of about $\frac{1}{2}$ inch. The peroneus longus is the outermost of the two. You see the tendon is covered by a sheath of loose areolar tissue. I can pick it up with my forceps. I am not going to separate it from the tendon. The fascia covering a tendon has a special gliding mechanism. The fascia glides back and forth with the tendon, giving it a greater amount of play. Before removing the tendon from its bed I

Fig 402—1

begin
of the
fixed by continuous catgut Lembert suture. 5. Probe along new tract for the transplanted tendon carrying a guide suture which is brought out in a loop in Fig 403 6.



Tom Jones

am going to place my silk fixation sutures. The insertion of the suture is facilitated when the tendon is in its place. I am using the Schede modification of the Lange stitch (Fig 402 3). It is important to place these sutures properly because pressure produces necrosis of the tendon. Silver has shown that silk sutures when placed transversely across the tendon cause local necrosis. The experiments which he carried out were for the purpose of determining not if necrosis of the tendon occurred but whether this necrosis interfered with the union of the tendon.

Now you see how easily I can handle the tendon by means of this fixation suture. (Severs the tendon beyond peroneal tubercle.) Now I raise the tendon out of its bed. You see these fibers as they extend to the tendon (Fig 403, 4). That is the mesotenon. You see these little red lines. They are the fine blood capillaries entering into the tendon. I save as much of the mesotenon as possible and therefore cut in a direction away from the tendon taking as much surrounding tissue as possible. I free the tendon to the lowermost muscle-fibers. Now the assistant holds the tendon protecting it with pledgets of cotton moistened in salt solution to avoid drying from exposure to the air.

I now introduce an eye probe along the deep fascia downward and inward to the tibialis anticus muscle in front (makes an incision in the skin and carries the silk suture through this aperture—Fig 403 5). I insert the probe again along the tibialis anticus muscle underneath the annular ligament and out through the first incision carrying the suture through that opening. The assistant now steadies the tendon straightens it out while I pull it through the track made by the silk suture (Fig 404 6). You see how the tendon descends down through this track, and now it emerges through the first incision over the

Fig 404—6 Fixation suture caught in loop of traction suture. 7 Peroneus longus sutured to insertion of tibialis anticus and inner surface of internal cuneiform bone. 8 Method of fixing tendon to new insertion. Each end is brought out at the lower angle of the split tibialis anticus tendon. 9 A loop is made and needle is reinserted through split tendon and transplanted tendon. The other end is brought out in the same manner and the ends are tied. This forms a figure-of-8 stitch.

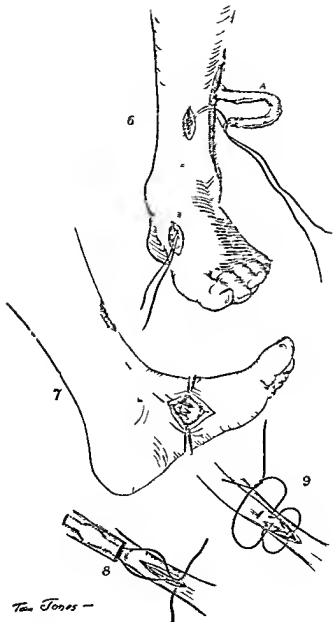


Fig 404

power in the muscles appears to be completely absent. It is in this type of cases that the Gallie operation is contraindicated. The Gallie operation should be employed only in those cases where there is a complete loss of function in the muscles. The Gallie operation is nothing more than a tendinous fixation of the foot and does not restore the function of partially paralyzed muscles. It is therefore done in those cases where the muscles



Fig. 405.—Case II. Photograph before operation. Notice abducted position of foot.

are hopelessly destroyed. By transplanting a healthy muscle to the outer side of the leg it will aid in restoring the latent power which we think exists in these parietic muscles.

Operation.—The incision is made from about 1 inch above the malleolus to the base of the first metatarsal bone (Fig. 406) (Makes incision through skin exposing the extensor longus hallucis muscle). I am preserving the deep fascia and I am going to transplant it with the sheath. The fixation suture is placed

insertion of the tibialis anticus. The assistant now extends the foot while I introduce the sutures through the split tendon of the tibialis anticus and peroneum. The two ends of the suture being inserted I now pull the tendon snugly into the slit and fasten it by several stitches (Fig 404 7-9). The skin is closed by interrupted silkworm sutures. The limb will now be placed in plaster in an extended and abducted position. We will cut windows in the cast and remove the sutures in ten days. The cast will remain for six weeks. We will then begin passive motion and massage after that time.

Postoperative Comments.—I have carried on experiments on tendon transplantation for the past year and have arrived at very interesting conclusions which I hope to publish in detail in a short time. The microscopic sections (see Figs 400 and 401) which I have submitted are from our animal experiments at Northwestern University Medical School.

CASE II.—This case is the opposite of the former. It is a case of paralytic valgus (Fig 405). The patient is twenty years of age. When she was ten years old she had an outspoken attack of infantile paralysis involving both lower extremities. After a few days of acute febrile symptoms, namely fever, vomiting, and general malaise, she found that the power in her limbs disappeared. The function in the left leg returned completely, but she found that when she began to walk the right foot was weak and gradually began to turn in.

Examination.—Right leg shows some degree of atrophy. She can adduct and extend her foot, but cannot abduct it. The tibialis anticus is strong and healthy, as is the extensor hallucis longus. In her case the peronei muscles are functionless, and I am going to transplant the extensor longus hallucis to the outer side of the foot to the insertion of the peroneus tertius.

I believe that there is some power in these peronei muscles although the patient seems to exert no effort to evert the foot. In those cases where the muscles have become paralytic, that is where there has been no complete loss of function, the tendons become elongated as Jones has shown, and as a result the

probe is now passed along the peroneus tertius muscle beneath the annular ligament to the upper surface of the base of the fifth metatarsal bone. I now enlarge the incision at the point of exit of the probe and expose the tendon of the peroneus

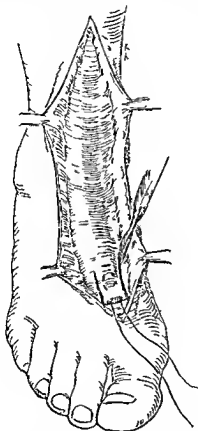


Fig 407 —Incision through skin and superficial fascia. Extensor longus hallucis tendon exposed. Fixation sutures in place. Dissection of tendon together with deep fascia begun.

tertius at its insertion. The probe which is still in place is now threaded with the fixation suture which is attached to the distal end of the extensor hallucis tendon and pulled through

in the same manner as in the former operation (Fig 407) You see that I do not sever the tendon from its insertion before introducing the fixation suture We will sever the tendon at the base of the first metatarsal bone This will make it sufficiently long to be carried over to the insertion of the peroneus tertius An incision is made with the knife on both sides of the tendon for a distance of $\frac{1}{4}$ inch through the peritendinous

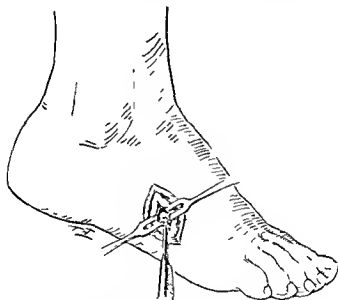


Fig 406—Implantation site in the base of the fifth metatarsal bone prepared
Peroneus tendon split and edges retracted

tissue (Fig 407) The tendon is now raised by means of the fixation silk suture out of its bed The surrounding connective tissue is cut on both sides of the tendon with the scissors as high up as the lowermost muscle fibers carrying the peritendinous tissue with it (Fig 408) It is necessary in doing this to sever the annular ligament The tendon is now freed and as you see, it is covered by the sheath and its specialized anatomic structures, together with the special gliding fascia An eye

the distal portion of the extensor hallucis tendon between the split tendon of the peroneus tertius and the traumatized periosteum of the fifth metatarsal bone. This is done as illustrated in Figs. 408 and 409.

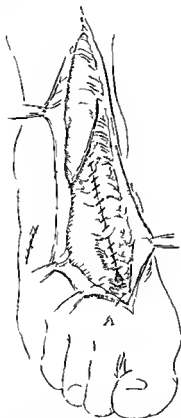


Fig. 409. Extensor longus hallucis tendon transposed to outer side of foot. Skin closed with horsehair. Bed of tendon closed with continuous catgut. A. Suture of stump of extensor longus hallucis tendon to extensor of second toe.

We will now return to the first incision. We have two conditions to deal with: first, the incision through the annular ligament, and second, the proximal portion of the extensor longus hallucis tendon. We can fix the proximal portion of the

the lower incision carrying the silk thread with it (Fig 408)

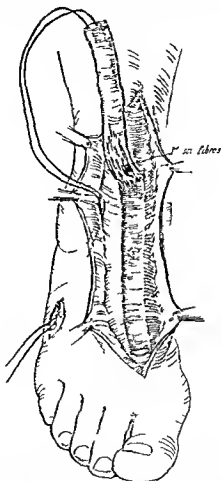


Fig 408 Dissection of the extensor longus hallucis tendon from an anatomic study. This illustration shows what structures are carried over with the tendon in our transposition. The tendon was removed as in our operation and the sheath opened. The mesotenon remains.

Now I pull the tendon down through the new canal. Here it can be seen emerging through the lower incision. I now fix

the distal portion of the extensor hallucis tendon between the split tendon of the peroneus tertius and the traumatized periosteum of the fifth metatarsal bone. This is done as illustrated in Figs. 408 and 409.

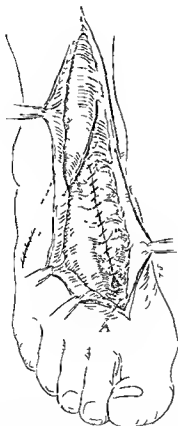


Fig. 409.—Extensor longus hallucis tendon transposed to outer side of foot. Skin closed with horsehair. Bed of tendon closed with continuous catgut. A. Suture of stump of extensor longus hallucis tendon to extensor of second toe.

We will now return to the first incision. We have two conditions to deal with, first, the incision through the annular ligament, and second, the proximal portion of the extensor longus hallucis tendon. We can fix the proximal portion of the

the lower incision carrying the silk thread with it (Fig. 4C)

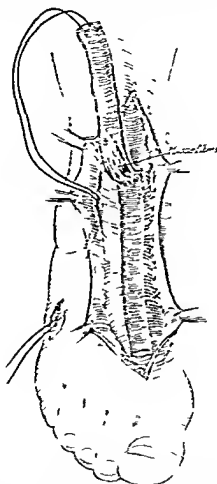


Fig. 4D.—Dissection of the exterior lateral biceps tendon from an anterior view. This illustration shows what structures are carried over with the tendon in our transposition. The tendon was removed as in our operation and the chest opened. The mesothorax remains.

Now I pull the tendon down through the new canal. Here it can be seen emerging through the lower incision. I now fix

the distal portion of the extensor hallucis tendon between the split tendon of the peroneus tertius and the traumatized periosteum of the fifth metatarsal bone. This is done as illustrated in Figs. 408 and 409.

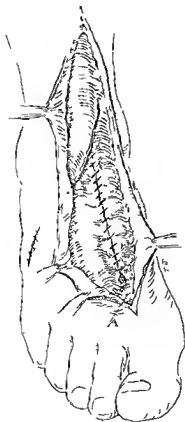


Fig. 409.—Extensor hallucis tendon.

Skin.

Suture.

We will now return to the first incision. We have two conditions to deal with, first, the incision through the annular ligament, and second, the proximal portion of the extensor longus hallucis tendon. We can fix the proximal portion of the

extensor longus hallucis tendon which is attached to the by means of catgut to the surrounding tissue burying it deep. In this way the toe will be held up. A better way, however is to suture it to the extensor of the second phalanx. (Suture extensor longus hallucis tendon to the extensor of second toe Fig. 409) Now we will expect to have function of the large toe. That is important since the large toe helps in propelling



Fig. 410—Same as Fig. 409 after operation. Winkling of the skin on outer side of foot showing contraction of the transposed extensor hallucis tendon.

the body in walking. We do not want the toe to drop down since in a short time it would bend under. We will now proceed to close the bed of the extensor longus hallucis tendon and annular ligament by a continuous catgut stitch (Fig. 409).

We will close the skin with horsehair and keep the foot at right angle for about four or five weeks.

The skin healed by primary union. The skin over the insertion of the tendon looked as if there were some infection. The edges were therefore retracted and there escaped a drop of serous fluid but no pus. This was believed due to necrosis and liquefaction of the surrounding tissue due to too much constriction. I was apprehensive that the tendon would loosen from its new mooring so a silkworm suture was inserted through the skin, subcutaneous tissue and tendon. Recovery was perfect. In the accompanying photograph (Fig. 410) a wrinkling of the skin can be seen which is due to contraction of the transposed tendon and can be traced to its insertion.

CLINIC OF DR. ALBERT J. OCHSNER

AUGUSTANA HOSPITAL

BILATERAL GRITTI-STOKES AMPUTATION

Summary A patient with paralysis of both legs below the knees of fifteen years duration, as the result of severe secondary anemia from duodenal ulcer and subdural hemorrhage. Technic of the amputation. After treatment—method of teaching patient to walk.

April 12 1918

HISTORY

THE patient is a married woman aged forty-eight years. Her mother died twenty five years ago of some growth, her father died two years ago of myocarditis. One sister and three brothers are living and well. She first entered the hospital fifteen years ago with the general statement that for several months before entering the hospital on May 1 1903 she had suffered from symptoms indicating the presence of gastric or duodenal ulcer complicating chronic appendicitis. She was anemic with a blood count of less than 1 000 000 red cells and she was markedly emaciated and extremely weak. She complained of increasing numbness of both feet and hands and an inability to see clearly. All of these conditions became worse from day to day until first the lower and then the upper extremities became paralyzed completely and she became totally blind. Before this blindness occurred an ophthalmoscopic examination was made and capillary hemorrhages were discovered accounting for the clouding of her vision and her total blindness. Bladder and rectum were paralyzed and there was marked difficulty in respiration. There was severe pain in the extremities for a number of weeks.

Within one month after the occurrence of blindness the condition of the eyes again began to improve. Within three months

COMMENTS AND OPERATION

DR. OCHSNER (April 12, 1918) This is a very extraordinary case. She came here about fifteen years ago having had a continuous hemorrhage from a small gastric ulcer. When she came here she was practically depleted from the hemorrhage, her red

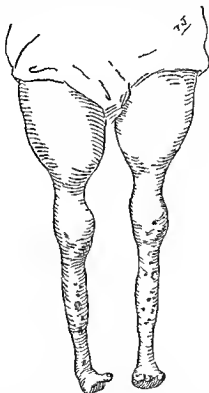


Fig. 411 — Appearance of legs before operation showing marked atrophy from middle of thigh downward

blood count being below 1,000,000. The blood was so pale that one could hardly get a hemoglobin reading. She also had a subdural hemorrhage, and as a result was paralyzed throughout her hands, arms, and legs. There was hemorrhage into the choroid, so that she was blind. The only organs that were not paralyzed were her heart and respiratory centers, so that she breathed a little

after this her respiration became fairly normal and there was a slight restoration, first of sensation and later of motion in the upper extremities. These continued to recover, leaving some contractures of fingers, with necrosis of the skin over the ends of several fingers.

Sensation also returned over the entire surface of both lower extremities, but motion never returned in any of the muscles below the knees.

There has been continued improvement in her general condition during the entire period of fifteen years, until her sight is again perfect, sensation and motion down to the thighs including bladder and rectum are normal. There is still some muscle atrophy, which is marked below the middle of the thighs.

At present her only complaint is paralysis of the legs below the knees and an extreme hyperesthesia to touch, all other sensations being subdued. She says that time and dates are very hard to remember and mean little or nothing to her.

Previous Illness—She had the usual diseases of childhood, typhoid at fifteen years of age and an appendectomy twelve years ago. She had another operation later, but does not remember just what was done.

Habits—Good.

Menstrual History—Menstruation began at fourteen years regular twenty-eight-day type up to the time she had typhoid. Following this she had irregular pain attacks from three to five days preceding the period, but very little pain during the period. She has not menstruated since the second abdominal operation was done.

She has been married twice, has never been pregnant. Her first husband died of pulmonary tuberculosis, her second husband is living.

General History—She has occasional headaches over the occiput which last two to three days. Appetite is fairly good. Hearing and sight are good. Bowels move only by enema. Urination is normal.

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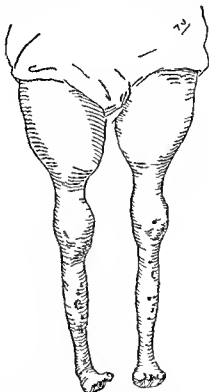


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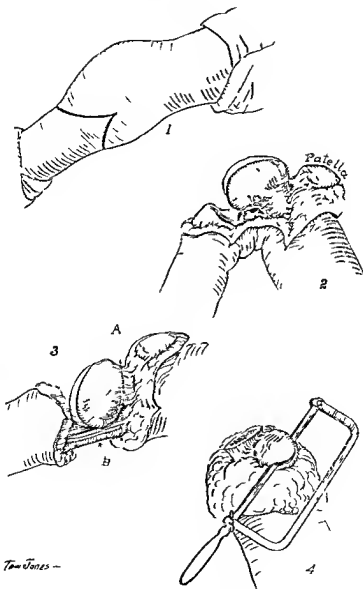


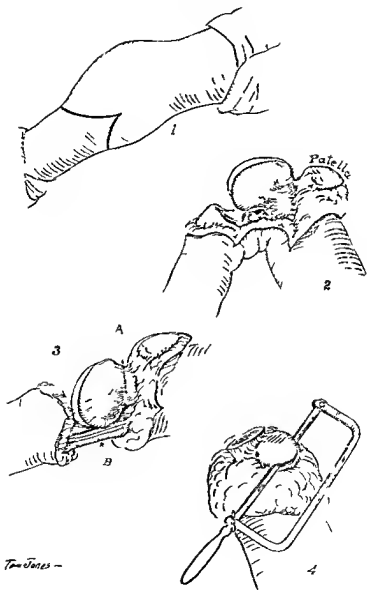
Fig 412

and the heart kept on beating. That was before the days of blood transfusion. If she came to us now in that condition we would immediately transfuse, giving her 600 c c of whole blood, and repeat that once a week.

Under treatment the blood became thick enough so that hemorrhage into the subdural space stopped. We put her on rectal feeding. As time went on the blood in the subdural space and the choroid was absorbed, so that the blindness disappeared and she began slowly to see. Then her hands and arms began to recover, as did the bladder and bowels. The condition has improved so that from her knees up her muscles are very well nourished, but the legs and feet are absolutely atrophic and there is scarcely anything left of them. Her toes began to drop off, so that we could snip them off with scissors. At the present time her legs are in very bad condition, being covered with ulcers because of the trophic changes, and it does not seem possible that after fifteen years those legs could regain their strength and nutrition, so that they would again become useful. It seems wisest to do an amputation through the knee joint and to utilize the patellæ, so that she can bear her weight on the patellæ. We propose to make a Gritti Stokes amputation of both thighs, sawing through the condyles and then bringing the patellæ up against the condyles.

You see the condition of these legs. The thighs are in good condition down to the knees, but from the knees down they are absolutely useless (Fig 411). You see the skin is perfectly good down to a point beyond the knee, so I believe we can make a typical Gritti Stokes operation and that she will really have very good legs to walk on with the aid of artificial limbs.

We may be able to do this without the use of an Esmarch constrictor. We will be prepared to put one on if necessary. We will do the left leg first making a long anterior flap and



Tom Jones -

Fig 412

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Fig 412.—Gritti-Stokes amputation. 1 Line of incision to make the anterior and posterior flaps. 2 The joint exposed after section of the patellar ligament. 3 The patella reflected upward and the popliteal vessels and nerves exposed. Dotted line (A) is line of section of femur (B). 4 The vessels have been doubly ligated the sciatic nerve resected as high as possible and the femur sawed off just above the condyles. The patella is being sawed in two longitudinally.

cutting off the patellar ligament (Fig 412 1) Now we will try to catch each vessel as we cut it There is too much bleeding on this side so we will apply an Esmarch constrictor on the other side The artery and vein are very thick walled

I have made a long anterior and a short posterior elliptical flap the anterior flap extending through the patellar ligament Then I have divided all the structures down to the lower end of the femur Then I have sawed the patella in two longitudinally so as to produce a freshened surface The femur was sawed off 6 cm above the joint transversely (Fig 412 2 3 4) The patellar stump and prepatellar ligaments were then placed in exact apposition with the end of the femur and the edges of the ligament sutured to the periosteum in order to hold it in place (Fig 413 5 6) The flaps were then sutured in place with interrupted catgut stitches leaving no hollow space The popliteal artery was tied twice with reliable catgut ligatures The popliteal nerve was stripped a distance of 6 cm above the point of severing the other soft tissues where it was sectioned with a V shaped cut All superfluous fat was removed before the flaps were sutured

The operation on the right extremity is carried out precisely in the same manner in order that both extremities may be exactly alike

This looks as though we had too much flap but when it is healed it will be just enough We did not have to use an Esmarch constrictor on either side We are closing these wounds without drainage

You will note how we apply the dressings There is a large loose pad of sterile gauze over the end of each stump but above the knee the bandaging is applied much more tightly Pressure on an amputation flap under the conditions here present is liable to cause necrosis of the flap because of its impoverished circulation hence our dressings are applied so as to produce absolutely no pressure (Fig 413 7 8)

The usual objection to the Gritti Stokes operation because of lack of space for making a satisfactory knee joint in the artificial leg does not apply to cases in which both legs have been

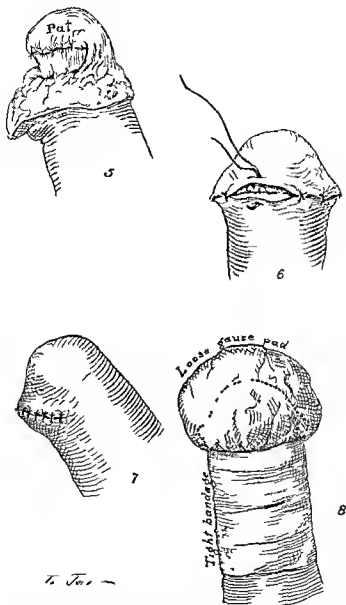


Fig. 413 — 5 The patella sutured to the end of the femur 6. Closure of flaps 7 Final result 8 Bandage applied very loosely over stump, but tightly around thigh. Dotted line shows relations of stump

amputated because the artificial limb-maker can suit his convenience in these cases. The additional length will be uniform on both sides and will, consequently, not result in any deformity.

The stumps are perfectly rounded and the suture line is at a point where it will not be irritated by the socket of the artificial limb. By carefully padding this socket the patient will be able to bear her entire weight on the end of the stump with complete comfort. This is especially important in this case because this patient will have to learn to walk after having been confined to her bed for fifteen years.

After three weeks these stumps will be covered with stockings and sockets extending half the length of each femur will be constructed of plaster-of-Paris bandages. These sockets will be removed daily and the stumps will be massaged, and the patient will be put through a systematic course of gymnastic training until she can stand and walk upon these sockets and only after she has attained this ability will artificial limbs be secured, because it will be much easier for her to learn to walk on these improvised sockets than upon artificial limbs.

We have a right to expect primary wound healing of these flaps so that there will be practically no scar tissue.

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